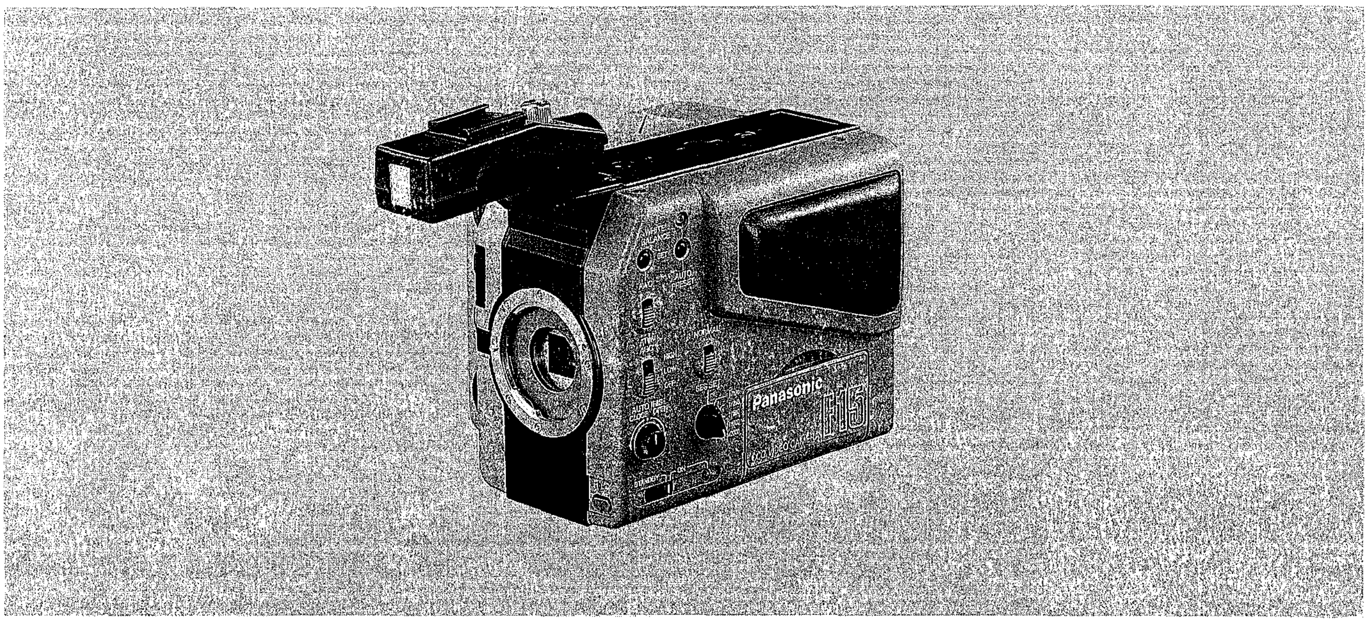
ORDER NO. AVS900279C8

Service Manual

System Camera

WV-F15E



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Panasonic

Matsushita Electric Industrial Co., Ltd.
Central P.O. Box 288, Osaka 530-91, Japan

Service Manual

System Camera

WV-F15E

Vol. 1

Circuit Description

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CIRCUIT DESCRIPTION

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SPECIFICATIONS

WV-F15E

Power Source : 12V DC
Power Consumption : 5.7W (Min), 18W (Max)
Scanning : 625 lines/50 fields/25 frames per second
Pick-up System : Integrated colour mosaic filter single chip CCD system
Pick-up Element : 2/3", 756(H) x 581(V) pixels, interline transfer CCD with colour mosic filter
Video Output Level : 1.0Vp-p PAL composite/75 ohms
Horizontal Resolution (Luminance) : 460 lines at center
Signal to Noise Ratio (Luminance) : 46 dB
Illumination Required : 1400 lux at F4.0
Required Minimum Illumination : 7 lux at F1.4 lens with +18dB gain-up at 30 % Luminance signal
7 lux at F1.4 lens with +18dB gain-up at 30% Luminance signal

Internal Microphone : Detachable Stereo Electret Condenser Microphone (optional : WV-MC12E)
External Microphone : -65dB, 600 ohms, unbalance M3 jack x 2 (Stereo)
Audio Output : -20dB/-60dB (Selectable) High impedance
Earphone Output : 8 ohm M3 Stereo Jack

Lens (Optional):	WV-LZ14/8AFE	WV-LZ14/12E	WV-LZ15/12E	WV-LZ14/15E
(1) **Auto Focus :**	Yes	No	No	No
(2) **Zoom Ratio :**	X8	X12	X12	X15
(3) **Focal Length :**	10.5 - 84mm	10.5 - 126mm	10.5 - 126mm	10 - 150 mm
(4) **Maximum Aperture Ratio :**	1 : 1.4 (F1.4)	1 : 1.6 (F1.6)	1 : 1.6 (F1.6)	1 : 2.0 (F2.0)
(5) **Focusing Range :**	1.3m - ∞	1m - ∞	1m - ∞	1.2m - ∞
(6) **MACRO Range :**	5cm - 1.3m	5cm - 1m	5cm - 1m	5cm - 1.2m
(7) **Iris Range of AIC :**	1.4 - 22, C	1.6 - 22, C	1.6 - 22, C (Automatic Auto, Lock or manual selectable)	2.0 - 22, C

(8) **Field Angle (degrees):**	TELE	WIDE	TELE	WIDE	TELE	WIDE	TELE	WIDE
Diagonal :	7.3	55.6	4.9	57.4	4.9	57.4	4.3	56.2
Horizontal :	6.1	44.3	4.1	44.3	4.1	44.3	3.4	46.3
Vertical :	4.6	39.9	3.1	33.9	3.1	33.9	2.6	35.5

	WV-LZ14/8AFE	WV-LZ14/12E	WV-LZ15/12E	WV-LZ14/15E
(9) **Filter Diameter :**	58mm, P = 0.75	72mm, P = 0.75	72mm, P = 0.75	77mm, P = 0.75
(10) **Flange Focal Length :**	17.526mm	17.526mm	17.526mm	17.526mm
(11) **Zoom Speed :**				
FAST :	Approx. 6 seconds	Approx. 7 seconds	Zooming/Focusing : controlled by lens control kit WV-LK11	Approx. 7 seconds
SLOW :	Approx. 9 seconds	Approx. 10 seconds		Approx. 10 seconds

Lens Mounting : Bayonet mount
Viewfinder : Black and White 1 Electronic Viewfinder with character display (optional : WV-VF02E)
White Balance : Auto Tracing White-Balance (ATW) or Manual Setting (AWC)
Electronic Shutter : 1/120, 1/250, 1/500, 1/1000, 1/2000 sec
10 pin Camera Cable Length : Approx. 2m
Maximum 10pin Camera Cable Length: Approx. 10m between camera and portable VTR/VTR/Power Supply
10 pin Connector Informations :
1. Video In/Out
2. Ground for Video
3. Serial Data Pulse (or Open)
4. Rec Tally and Serial Clock Pulse
5. Standby + Audio (CH2(R)) Out
6. Rec Start/Pause out
7. Audio (CH1(L)) out
8. Ground for Audio
9. Ground
10. +B/12V In

Operational Ambient Temperature : 0°C - +40°C
Operational Ambient Humidity : Less than 90%
Camera Mounting : One 1/4"-20 threaded standard camera tripod
Dimensions :
WV-F15E only : 138.5(W) x 114(H) x 136(D)mm
WV-F15E with WV-KT115E: 248(W) x 246(H) x 476 (D) mm
Weight :
WV-F15E only : 1.1 kg
WV-F15E with WV-KT115E: 2.5 kg

Weights and dimensions shown are approximate.
Specifications are subject to change without notice.

COMPOSITIONS

o WV-F15E

o Camera Head	1 pc
o R03 (AAA) Type Dry Battery	1 pc

o WV-KT115E

o 1" Electronic Viewfinder (WV-VF02E)	1 pc
o Grip Shoulder (WV-GR15E)	1 pc
o Stereo Microphone (WV-MC12E)	1 pc
o Cheek Pad (WV-Q43AE)	1 pc
o Camera Strap (WV-Q44E)	1 pc

OPTIONAL ACCESSORIES

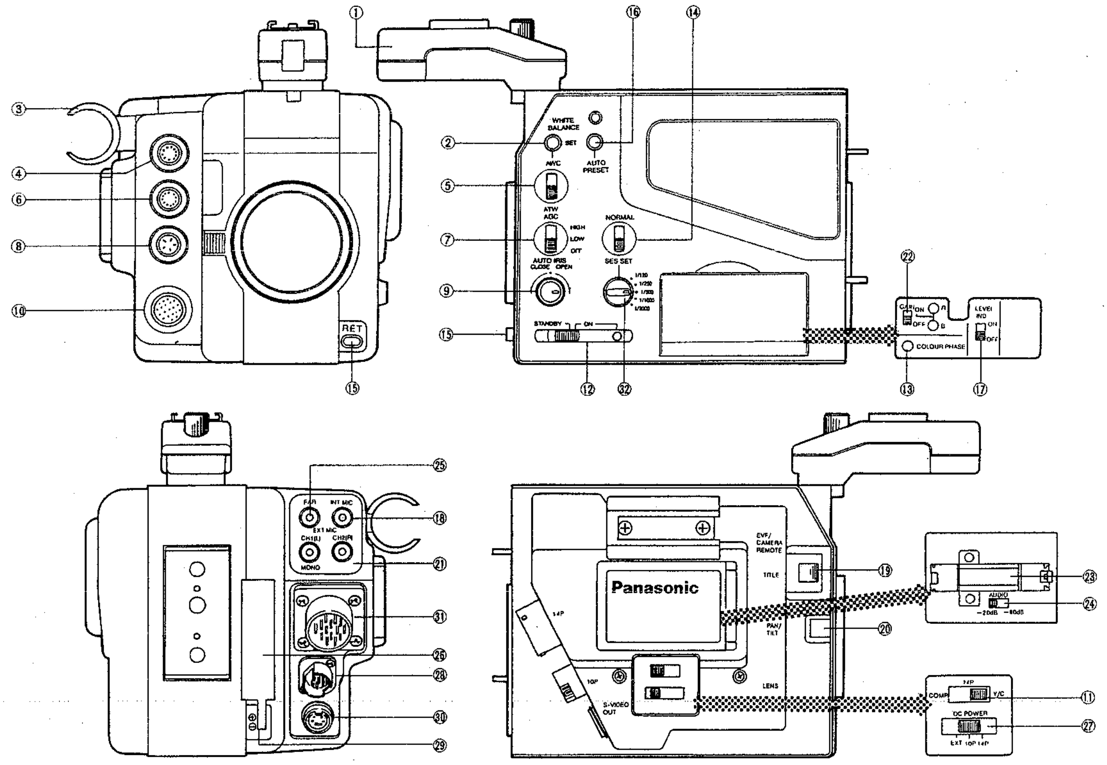
o 35mm SLR Lens Mount Adaptor

WV-LT21E (For CANON)
WV-LT22E (For NIKON)
WV-LT23E (For MINOLTA)
WV-LT24E (For OLYMPUS)
WV-LT25E (For PENTAX)

o X1.5 Tele Conversion Lens	WV-CL19
o Carrying Case	WV-CC29E
o AC Adaptor	WV-PS03E
o Gen-Lock Adaptor	WV-AD36E
o Camera Remote Controller	WV-CR12E
o Pan/Tilt Head	WV-PH10E
o Remote Control Unit	WV-RC35
o Mounting Bracket	WV-Q39AE
o Lens Control Kit	WV-LK11
o Stereo Microphone	WV-MC12E
o RCU Adaptor	WV-AD37E
o X12 Power Zoom Lens	WV-LZ14/12E
o X15 Power Zoom Lens	WV-LZ14/15E
o X12 Automatic Iris Studio Zoom Lens	WV-LZ15/12
o 1 Electronic Viewfinder	WV-VF02E
o Studio Cable	14C-30
o Full Keyboard Titler	WV-KB12E
o NEGA/POSI Slide Adaptor	WV-AD15BE
o Lens Filter Kit	WV-LK10AE
o 10 pin Camera Extension Cable	10H-30ASE 10H-50ASE
o 14 pin VTR Cable	WV-CA14A/14E

MAJOR OPERATING CONTROLS AND THEIR FUNCTIONS

- **SYSTEM CAMERA WV-F15E**


①
⑯
⑭
③
④
⑥
⑧
⑩
RET
⑮
WHITE BALANCE
SET
AWC
AUTO PRESET
ATW
AGC
HIGH
LOW
OFF
NORMAL
AUTO IRIS
CLOSE OPEN
SES SET
1/120
1/250
1/500
1/1000
1/2000
STANDBY
ON
②
⑤
⑦
⑨
⑮
⑫
㉜
㉒
GAIN
ON
OFF
R
B
LEVEL IND
ON
OFF
COLOUR PHASE
⑬
⑰
EAR
INT MIC
EXT MIC
CH1(L)
CH2(R)
MONO
㉕
⑱
㉑
㉛
㉖
㉘
㉚
㉙
Panasonic
EVF/ CAMERA REMOTE
TITLE
PAN/ TILT
LENS
14P
10P
S-VIDEO OUT
⑲
⑳
AUDIO
−20dB
−60dB
㉓
㉔
14P
COMP
Y/C
DC POWER
EXT
10P
14P
⑪
㉗

1. **ATW Sensor**
   This sensor detects characteristic/colour temperature of light source and controls the gain of red and blue signal individually and automatically in order to set the white balance automatically when the White Balance Selection Switch (2) is set to the ATW position.
   Note : Do not block the sensor during the auto tracing white-balance mode.

2. **White Balance Set Switch (WHITE BALANCE SET)**
   The white balance can be set by pressing this switch when the White Balance Selection Switch (5) is set to AWC position.

3. **Microphone Holder**
   An optional internal microphone WV-MC12E can be sliden into this holder.

4. **EVF/Camera Remote Connector (EVF/CAMERA REMOTE) (10-Pin)**
   When an optional 1" detachable electronic viewfinder WV-VF02E or camera remote controller WV-CR12E is used, connect the 10-pin connector here.

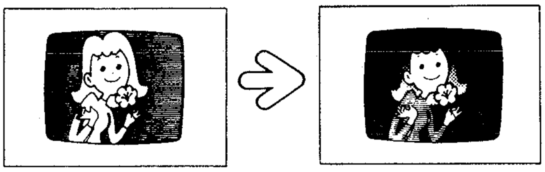
5. **White Balance Selection Switch (AWC/ATW)**
   This switch selects white balance mode as follows;
   AWC : The white balance can be set automatically by the White Balance Set Switch (2).
   When the blinking WHITE is displayed on the electronic viewfinder, depress the White Balance Set Switch (2).
   ATW : The white balance is automatically set by detecting the characteristic/colour temperature of light source with the ATW sensor (1) and controls the gain of red and blue signal even if the characteristic/colour temperature changes.
   Note : 1. It is recommended to use the ATW position if quick setting up is required or the characteristic/colour temperature of light would vary during shooting.
   2. It is recommended to use the AWC position if the characteristic/colour temperature of scene does not vary.

6. **Character Generator Connector (10P) (TITLE)**
   When an optional character generator WV-KB12E is used, connect the 10-pin character generator connector here.

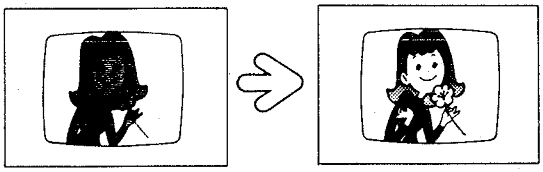
7. **AGC Selection Switch (AGC HIGH/LOW/OFF)**
   Normally set this switch to OFF position. Positions LOW and HIGH increase the video output amplitude for dark scenes and are equivalent to opening the lens iris two or three F stops.

8. **Pan/Tilt Connector (5P) (PAN/TILT)**
   When an optional pan/tilt head WV-PH10E is used, connect the 5-pin pan/tilt connector here.

9. **Auto Iris Control**
   This can manually adjust the lens iris opening to compensate for unusual lighting conditions. When the object is in bright light and the background is dark, adjust this knob to close the lens iris opening.



When the background is bright and the object appears to be too dark, adjust this knob to open the lens iris opening.



At the centre detent position, the auto iris is operated in standard condition.

Note : (1) Whenever the iris is manually adjusted, this knob should be reset to the centre detent position after the camera is used under unusual lighting conditions.

(2) When the camera is aimed at the scene which contains excessively bright object such as the sun or lamp, blue vertical bar may appear in the picture. This is peculiar phenomenon of CCD and it is normal. The camera should be operated avoiding such scene.

(3) This control should be set to the AUTO position when the camera is used with the remote control unit (RCU).

10. Lens Connector (20P) (LENS)

This connects the auto iris power servo control zoom lens which automatically adjusts the incoming light intensity by changing the lens iris.

11. 14P output signal selector (COMP-Y/C)

Either a composite video signal for 3/4" VTR or a Y/C video signal for 1/2" VTR is fed from 14P connector by selecting the position of this switch.

12. Standby Switch (STANDBY/ON)

This switch is used for longer battery operation and selects the conditions of the camera and the Panasonic portable VTR as;

ON : The camera and the portable VTR are operated normally. The red LED turns on.

STANDBY : The cylinder motor of the portable VTR is OFF with the tape threaded and the camera functions are also OFF, except Sync and Microprocessor.

The unit is in operating condition after necessary adjustments.

When the camera and portable VTR are not used for 5-15 minutes, set the switch to the STANDBY position.

Note :
1. When the camera is operated with some of other manufacture's VTR, the VTR may operate incorrectly in the standby mode of the camera.
2. The white balance set previously is memorized even if the standby switch is set to the STANDBY position.

13. Colour Phase Control (COLOUR PHASE)

This control allows fine adjustment of the colour phase. This control should be adjusted for fine colour matching adjustment while this camera is used with RCU adaptor and RCU.

14. Strobe Effect Shutter/Normal Selection Switch (SES/NORMAL)

This switch selects the strobe effect shutter function;

SES : The camera is in strobe effect shutter and video signal from 1/120 to 1/2000 (Variable) sec in every 1/50 sec is provided from the 10-pin VTR Connector (28), 32-pin Connector (26), 14-pin VTR Connector (31), and S-VIDEO OUT Connector (30).

NORMAL : Normal video signal is provided from the 10-pin VTR Connector (28), 32-pin Connector (26), 14-pin VTR Connector (31), and S-VIDEO OUT Connector (30).

15. Return Video Button (RET)

When the 3/4" U-vision portable recorder, connected through the 14-pin camera input connector, or an S-VHS VTR recorder is set to the playback mode, the played back picture can be viewed as long as this button is kept pressed.

16. Auto Preset Button (AUTO PRESET)

The green LED lights up when the power of the camera turns on. The AGC, AWC/ATW, SES, R&B GAIN becomes preset automatically in this moment. Normally, the camera will be used under this conditions (LED staying on).

Once the LED turns on, none of those functions can not be adjusted regardless of the position of those buttons.

Push AUTO PRESET button (LED becomes off) for manual adjustment of those functions.

Push AUTO PRESET button again (LED turns on) for preset conditions of the camera.

AUTO PRESET will not operate, when an optional RCU or Camera Remote Control is used with.

17. Level Indicator Switch (LEVEL IND ON/OFF)

When this switch is set to the ON position, pictures which exceed the specified level (100%) produce a zebra pattern in the viewfinder.

When the background is bright and the object appears too dark in automatic iris control mode, adjust the lens iris in the manual iris control mode so that the object in the viewfinder is almost developing a zebra pattern. In this case the background may become overexposed.

Set this switch to the OFF position in the automatic iris control mode.

18. Internal Microphone Connector (INT/MIC)

When an optional microphone WV-MC12E is used, connect the microphone connector here.

19. Flangeback Adjustment Gear

Flangeback of the camera can be adjusted by rotating this gear clockwise or counterclockwise.

20. Lens Release Button

When removing the lens, press this button to unlock the bayonet mount and rotate the lens approx. 65° clockwise.

21. External Microphone Connector for Stereo (EXT MIC MONO CH1 (L)/CH2 (R))

An external microphone with output level of approximately -70dB can be connected to this M3 connector. When an external microphone is connected, the internal microphone is mechanically disconnected.

When the mono audio VTR is connected, the only CH1 (L) microphone can be recorded.

22. Colour Adjustment (GAIN R/B)

GAIN switch to OFF position

The red and blue colours are balanced by adjusting these control and preset at the centre position which usually provides accurate colour reproduction.

GAIN switch to ON position

However, under some conditions it may be necessary to compensate by adjusting these controls.

To obtain the best possible colour, set these controls at the centre position in both the AWC and ATW white balance mode.

23. Backup Battery Compartment

The backup battery R03 (AAA size) is installed into this compartment to memorize the internal title and also to function the date and time continuously when the camera power source is off.

24. Audio Level Selection Switch (AUDIO -20dB/-60dB)

Two audio output levels for the VTR can be selected : -20dB or -60dB. It is factory-set to the -20dB position.

25. Stereo Earphone Jack (M3) (EAR)

When the stereo earphone (not provided) is connected, the stereo microphone sound of the camera can be monitored. When the mono earphone (not provided) is connected, the CH1 (L) mono microphone sound of the camera can be monitored.

26. 32-Pin Connector

This connector is for a connection of an optional AC adaptor WV-PS03, Gen-lock adaptor WV-AD36E or RCU adaptor WV-AD37E.

27. DC Power Selection Switch (DC POWER: EXT, 10P, 14P)

EXT : This position is used for selecting the power source either from AC adaptor WV-PS03, RCU adaptor WV-AD37E or Gen-lock adaptor WV-AD36E.

10P or 14P : This position is used for selecting the power source either from VHS VTR or 3/4" VTR, S-VHS VTR.

28. 10-Pin VTR Connector (VTR)

Portable VHS VTR shall be connected here.
(Composite signal only)

29. VTR Compatibility Switch (RUN,⊕/⊖)

The logic level of the camera trigger may be incompatible and reversed, so that the VTR pauses when it should run and vice versa. In this case, set the switch position to other side.

When this camera is connected with Panasonic portable VTRs, set the switch to ⊕ position.

When this camera is connected to a VHS portable VTR of another manufacturer, set the switch to ⊖position.

Note : Set the VTR Compatibility Switch (RUN ⊕ / ⊖) on the camera to the ⊕ position when using the RCU 3/4" VTR or S-VHS VTR.

30. S-VIDEO OUT

S-VHS signals (Y/C) are fed from this connector.

31. 14-pin VTR Connector (14P)

A portable VTR which has 14-pin camera connector shall be connected hert.

The output video signal is set to either composite or Y/C signal by 14P Output Signal Selector (11).

32. Shutter Speed Selection Switch

When operating the Strobe Effect Shutter mode (14), this function should use with it. WV-F10 MARK II offers five different speeds, 1/120, 1/250, 1/500, 1/1000 and 1/2000 seconds.

CIRCUIT DESCRIPTION

1. Principle of CCD Color Video Camera

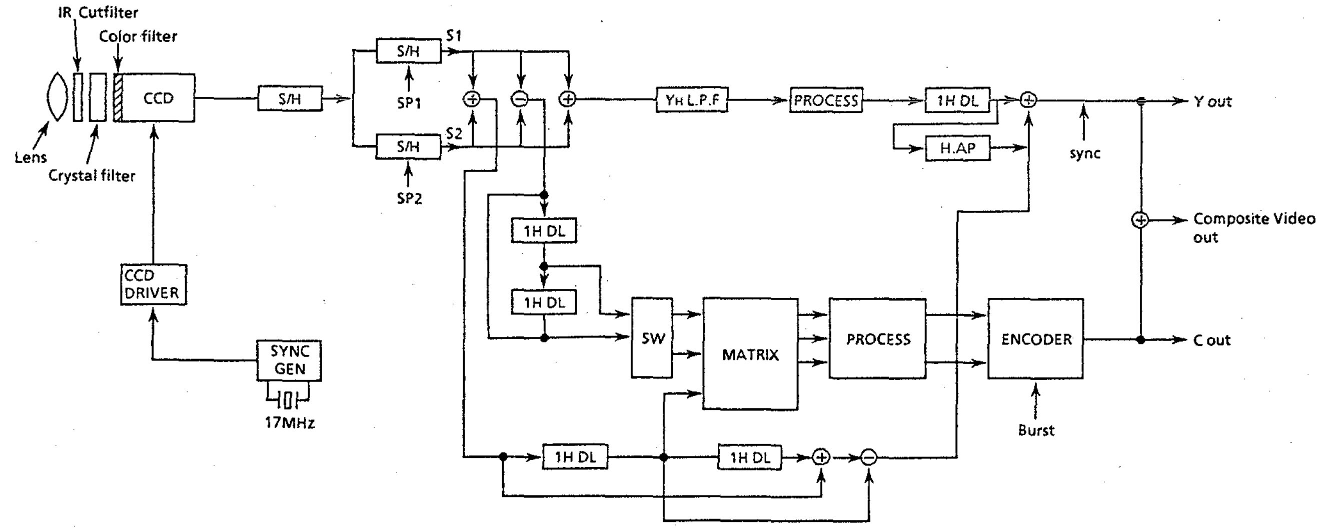

IR Cutfilter
Color filter
Lens
Crystal filter
CCD
S/H
S/H
S1
SP1
S/H
S2
SP2
Yн L.P.F
PROCESS
1H DL
H.AP
sync
Y out
Composite Video out
1H DL
1H DL
SW
MATRIX
PROCESS
ENCODER
C out
Burst
CCD DRIVER
SYNC GEN
17MHz
1H DL
1H DL

Fig. 1-1 Block Diagram of Video Signal Processing Circuit

The incoming light passes through the lens, the infrared (IR) cut filter, and crystal filter to reach the surface of the CCD image sensor. The CCD image sensor produces the output signal corresponding to incoming light intensity.

The output signal is converted into prevideo signal by sample hold circuit.

The signal is divided into two ways through sample hold by SP1 and sample hold by SP2 and obtained S1 and S2 signals. These signal are then divided into three ways.

First signal obtained by mixing S1 and S2 is supplied through Yн L.P.F., Process and Y signal is obtained after mixing with H. V aperture signals.

Second signal obtained by S1 - S2 is supplied through delay line, SW, matrix, Process to make R-Y_L, B-YL signals, which are supplied to Encoder to make Chrominance signal.

Third signal obtained by mixing S1 and S2 is supplied through delay line to matrix as YL signal. YL signal is then supplied through delay line and vertical aperture signal is obtained, it is mixed with horizontal aperture signal.

Y and C signals are mixed to produce composite video signal.

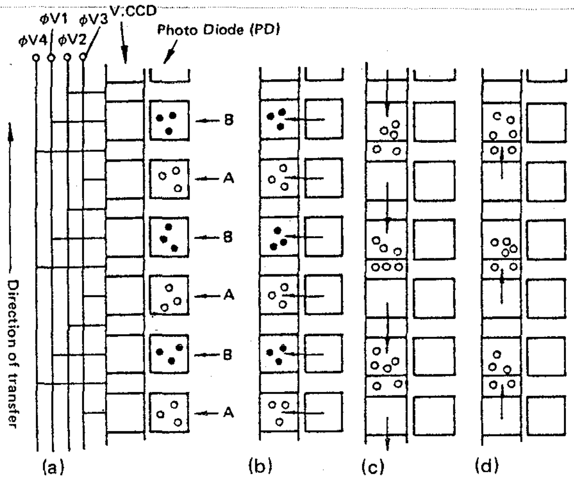

φV1
φV3
V.CCD
φV4
φV2
Photo Diode (PD)
B
A
B
A
B
A
Direction of transfer
(a)
(b)
(c)
(d)

Fig. 1-2 Readout Organization of Signal Charge "Field Integration Mode"

a) Charge storage in the photo-diodes
b) Charge transfer from PDs to VCCD
c) Mixing of charges in VCCD for field A
d) Mixing of charges in VCCD for field B

Figure 1-2 indicates the signal charge readout system. This system is called the "field integration" mode, whereby the outputs of a pair of PDs are mixed to produce a single charge packet.

First, each PD charges to a level which is dependent on the level of incident illumination. These charges are then shifted to the VCCD by vertical transfer pulses 1 and 3 (øV1 & øV3). Next, pairs of charges are mixed to produce charge packets. Different pairs of charges are mixed for fields A and B.

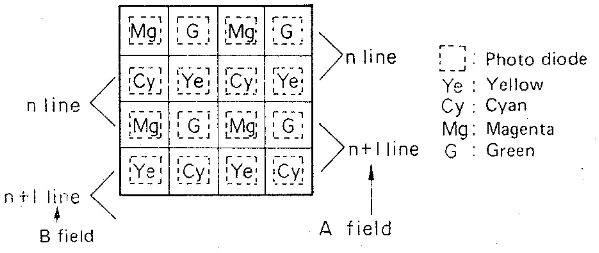

Mg
G
Mg
G
Cy
Ye
Cy
Ye
Mg
G
Mg
G
Ye
Cy
Ye
Cy
n line
n line
n+1 line
n+1 line
B field
A field
Photo diode
Ye : Yellow
Cy : Cyan
Mg : Magenta
G : Green

Fig. 1-3 New Color Filter Geometry

Figure 1-3 shows the layout of the color filter. the mixing scheme is shown for birth fields as well. For example, to produce line 1 of field A, rows 1& 2 are mixed, Line 2 is produced by mixing rows 3 & 4,and so on. To produce the first line of field B, rows 2 & 3 are mixed, followed by 4 & 5 for the next line, and so on.

The output signals from the CCD image sensor are follows;

Complete signal, line N	$S_N = Y_N + C_N \sin(\omega c.t)$
Complete signal, line N + 1	$S_{N+1} = Y_{N+1} + C_{N+1} \sin(\omega c.t)$
Luminance component, line N	$Y_N = (Ye+G) + (Cy+Mg) = 2R + 3G + 2B$
Luminance component, line N + 1	$Y_{N+1} = (Ye+Mg) + (Cy+G) = 2R + 3G + 2B$
Chrominance component, line N	$C_N = (Cy+Mg) - (Ye+G) = 2B - G$
Chrominance component, line N + 1	$C_{N+1} = (Ye+Mg) - (Cy+G) = 2R - G$

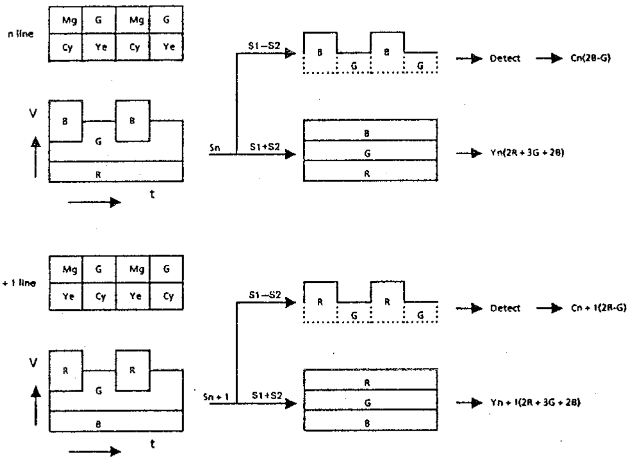

n line
Mg
G
Mg
G
Cy
Ye
Cy
Ye
V
B
G
R
t
S1−S2
Sn
S1+S2
Detect
Cn(2B-G)
Yn(2R+3G+2B)
n+1 line
Mg
G
Mg
G
Ye
Cy
Ye
Cy
R
G
B
Sn+1
Cn+1(2R-G)
Yn+1(2R+3G+2B)

Fig. 1-4 Color Signal Separation (Field "A")

Infrared Cut Filter

As shown in Fig. 1-5 the CCD image sensor has sensitivity in infrared region beyond the visible range.

The infrared (IR) cut filter blocks the infrared light rays which the human eye does not see as light.

If the signal is made by using the infrared rays which the human eye can not normally see, picture on the monitor and that seen with the naked eye would differ substantially.

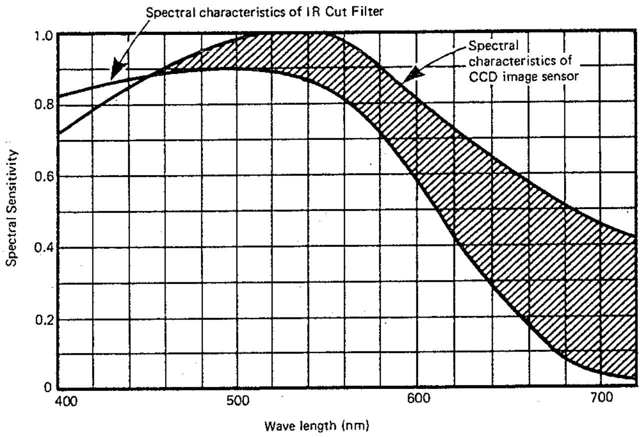


Fig. 1-5 IR Cut Filter Response

Crystal Filter

The yellow, cyan, green and magenta images are modulated by the fine mosaic filter built into the CCD image sensor, a false signal could develop due to interference between the fine mosaic filters and fine detail objects. The crystal filter is an optical low pass filter which prevents the occurrence of such false signals by blocking the high frequency components of images.

2. Sensor Board

CCD Image Sensor

The CCD image sensor used in the single-chip camera has a color separating system using the field integration operation mode which has superior characteristics, such as no field time lag and less false signal.

Furthermore a newly developed color filter array consisting of four colors, yellow, cyan, green and magenta gives a large luminance signal and a deep modulated color signal by adopting a line sequential color differential method.

The CCD image sensor ICX024 has 439236 picture elements (vertical (V) 581 x horizontal (H) 756). Its image size is 6.6(V) x 8.8(H)mm^2 so that a 2/3-inch optics and lens can be used.

The CCD image sensor is mounted on dual in line package with 20 pins and has a optical window in front of the cell as shown in Fig. 2-1.

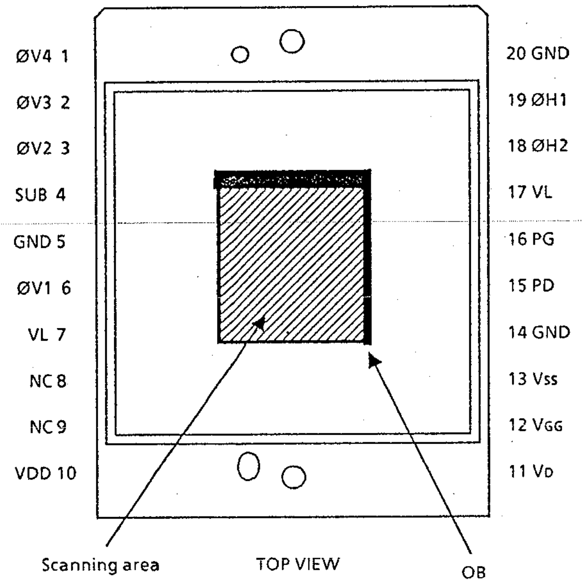


Fig. 2-1 Appearance of CCD Image Sensor

Items	Value	Unit
Chip Size	8.20(V) × 10.0(H)	mm^2
Cell Size	11.0(V) × 11.0(H)	μm^2
Image Size	6.6(V) x 8.8(H)	mm^2
Number of elements	581(V) × 756(H) (Excluding O.B)	pcs

Table 1 Specification of CCD Image Sensor ICX024

The pin identification of CCD image sensor ICX024 is as follows;

Pin No.	Pin Name	Description
1	øV4	V Transfer Pulse 4
2	øV3	V Transfer Pulse 3
3	øV2	V Transfer Pulse 2
4	SUB	Substrate
5	GND	Ground
6	øV1	V Transfer Pulse 1
7	VL	Protection for Bias
8	NC	------
9	NC	------
10	VDD	Power
11	VO	Video Output
12	VGG	Output Gate
13	Vss	Output Source
14	GND	Ground
15	PD	Precharge Drain Bias
16	PG	Output Reset Clock
17	VL	Protection for Bias
18	øH2	H Transfer Pulse 2
19	øH1	H Transfer Pulse 1
20	GND	Ground

2-1 Horizontal &Vertical Pulse Generator Circuit

This board receives CCD drive pulses and feeds them to the CCD image sensor IC1. The CCD output signal from IC1 is sent from pin 11 through buffer Q1 to Sample/Hold circuit on the Drive board.

The horizontal transfer pulse øH1 and øH2 from the Drive board are fed to pin 4 and 2 of Driver IC2. The outputs are developed from øH1 and øH3 by adding a DC offset to each by diode pair D2. These pulse are fed to IC1 pins 9 and 8.

Vertical transfer pulse øV1, øV2, øV3 and øV4 are changed to proper levels and supplied to pins 6, 3, 2 and 1 of IC1 respectively.

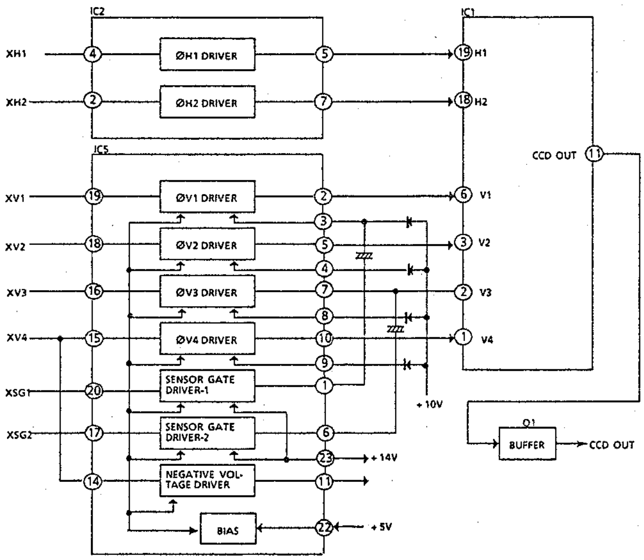


Fig. 2-2 Horizontal & Vertical Drive Pulse Generator Circuit

2-2 Aspect Ratio Correction Circuit

This circuit consisting of IC4, IC6, IC7 and IC8 corrects aspect ratio of picture.

The output signal from CCD image sensor IC1 makes slightly wider picture to horizontal comparing with normal picture due to difference of clock frequency.

To solve this phenomenon, increase the horizontal clock frequency so that picture looks naturally.

However, after increasing the horizontal clock frequency, picture on the monitor shifts approx. 13 clocks to left side.

This circuit makes pulse to remove the 13 clocks and shifts the picture to center on the monitor.

3. Drive Board

3-1 CCD Drive Pulse Generator Circuit

This circuit receives vertical drive pulse (VD) from the sync generator circuit in the Sync board and clock pulse and horizontal drive pulse(HD) from clock oscillator IC10, and generates CCD drive pulses and other pulses.

The pin identification of CCD drive pulse generator IC8 is as follows;

Pin No.	Pin Name	In/Out	Description
1	SP1	Out	Color separation sample hold pulse
2	SHD	Out	Sample hold data pulse
3	SHP	Out	Sample hold precharge pulse
4	XV4	Out	V Transfer Pulse 4
5	XV2	Out	V Transfer pulse 2
6	Vss	------	Ground
7	T1	------	Ground
8	XV3	Out	V Transfer pulse 3
9	XV1	Out	V Transfer pulse 1
10	XSG2	Out	Read out pulse 2
11	XSG1	Out	Read out pulse 1
12	XPG	Out	CCD out reset pulse
13	FL	In	Shutter flicker less
14	VAA	------	Not Used
15	Vss	------	Ground
16	XH2	Out	H Transfer pulse 2
17	XH1	Out	H.Transfer pulse 1
18	VDD	------	+5V
19	VDD	------	+5V
20	MODE4	------	+5V
21	Xsu6	Out	X Substrate
22	EN	In	Shutter control
23	D2	In	Shutter speed select 2
24	D1	In	Shutter speed select 1
25	D0	In	Shutter speed select 0
26	MODE3	In	NTSC/PAL Select
27	MODE2	------	Ground
28	MODE1	------	Ground
29	OSCI	------	Ground
30	OSCO	------	Not Used
31	Vss	------	Ground
32	CK	In	Clock
33	XCK	Out	Clock
34	VD	In	Vertical drive pulse
35	HD	In	Horizontal drive pulse
36	CL	Out	Clock for Sync Generator
37	T2	------	Ground
38	PBLK	Out	Pre blanking pulse
39	ID	Out	Identification pulse
40	CLP3	Out	Clamp pulse 3
41	CLP2	Out	Clamp Pulse 2
42	CLP1	Out	Clamp Pulse 1
43	VDD	------	+5V
44	XDL2	Out	Clock pulse for delay line
45	XDL1	Out	Clock pulse for delay Line
46	MODE6	------	Not used
47	MODE5	------	Not Used
48	SP2	Out	Color separation sample hold pulse

3-2 Clock Oscillator Circuit

This circuit consisting of IC10 and IC4 receives horizontal drive pulse (HD) and generates 28.96MHz.
The 28.96MHz clock pulse is supplied through buffer Q14 to pin 32 of IC8 to CCD drive pulse generator.
The horizontal drive pulse (HD) obtained at pin 8 of IC10 is supplied through inverter IC4 (b) to pin 35 of IC8.

3-3 Sample Hold Circuit

This circuit receives the modulated CCD output signal from the CCD image sensor IC1 on the Sensor board and eliminates noise component and produces S1, S2 and prevideo signal.
The CCD output signal from Sensor board is supplied through pin 13 to both sample hold circuits inside IC3. The noise component is gated by SHP supplied through pin 16.
The signal and noise components are gated by SHD supplied through pin 17.
The gated noise and noise + signal are then supplied to differential amplifier, where noise component is eliminated and signal is inverted. The signal obtained at pin 6 is then supplied through pin 4 to other sample hold pulses, where the signal made from Mg/Cy is gated by SP1, the signal made from G/Ye is gated by SP2.
Those gated signals are supplied to LPF to eliminate switching noise and then supplied to pins 36 (S1), 32(S2) of CN2 through clamp circuit, blanking cleaner and pins 32 and 29 of IC3.
On the other hands, the signals obtained at pins 32 and 29 of IC3 are supplied through buffer Q16, Q15 to pins 4 and 1 of IC11, where those signals are mixed to produce prevideo signal by XDL1 and XDL2 supplied from pins 13 and 5 of IC11.
The produced prevideo signal is supplied through Q17, Q18 to pin 37 of CN2.

3-4 AGC Circuit

This circuit changes gain supplied to prevideo signal by position of AGC Selection Switch.
The prevideo signal obtained at pin 40 of IC3 is supplied to AGC detect control Q7, Q8 and signal component is eliminated by C29 and remaining DC voltage is then fed to the AGC control circuit where it is compared with the reference DC voltage set by VR1 (AGC LEVEL). The error DC voltage obtained at pin 2 of IC3 is then supplied through pins 8 and 9 of IC11 and pin 9 of IC3 to differential amplifier to control the gain of prevideo signal and to keep constant level.
When the AGC Selection Switch is set to Low or High position, the gain is automatically controlled.
When the switch is set to OFF position, the gain control loop is opened and the gain of AGC is set by VR2 (AGC OFF LEVEL).

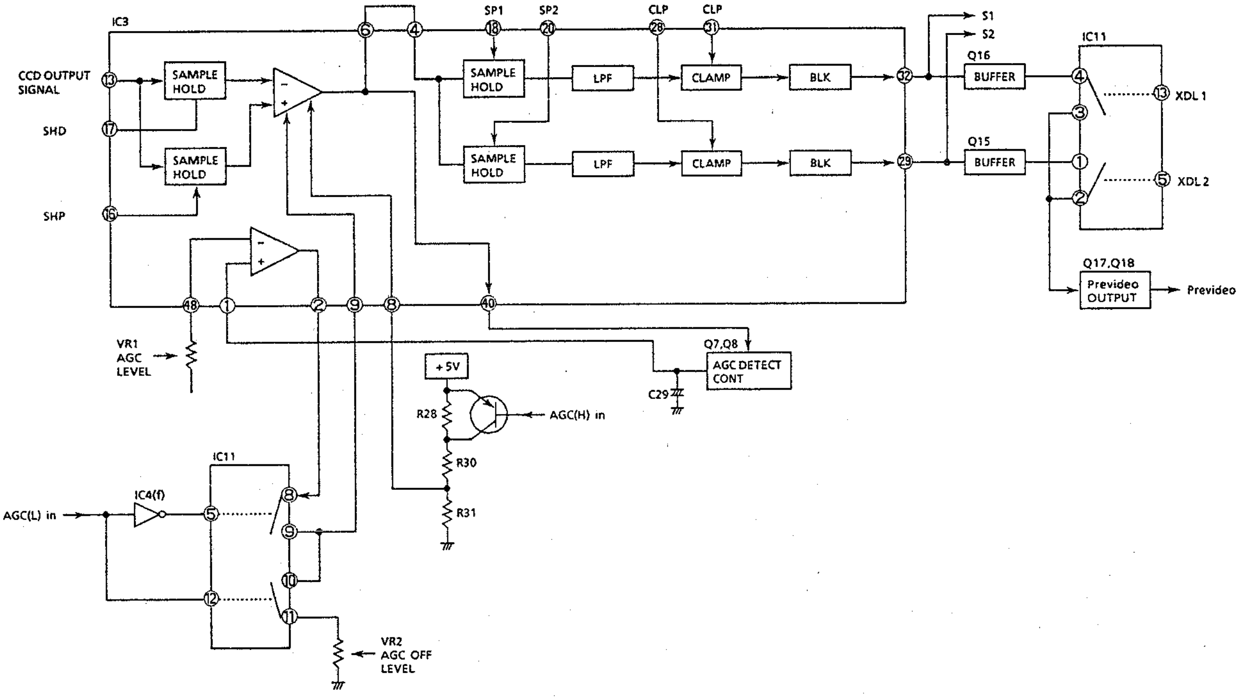

IC3
CCD OUTPUT SIGNAL
SHD
SHP
⑬
⑰
⑯
SAMPLE HOLD
SAMPLE HOLD
⑥
④
SP1
SP2
⑱
⑳
CLP
CLP
㉘
㉛
SAMPLE HOLD
SAMPLE HOLD
LPF
LPF
CLAMP
CLAMP
BLK
BLK
㉜
㉙
S1
S2
Q16
BUFFER
Q15
BUFFER
IC11
④
③
①
②
⑬ XDL 1
⑤ XDL 2
Q17,Q18
Prevideo OUTPUT
Prevideo
㊽
①
②
⑨
⑧
㊵
VR1
AGC
LEVEL
Q7,Q8
AGC DETECT CONT
C29
+5V
R28
AGC(H) in
R30
R31
IC11
IC4(f)
AGC(L) in
⑤
⑧
⑨
⑩
⑫
⑪
VR2
AGC OFF
LEVEL

Fig. 3-1 Sample Hold Circuit/AGC Circuit

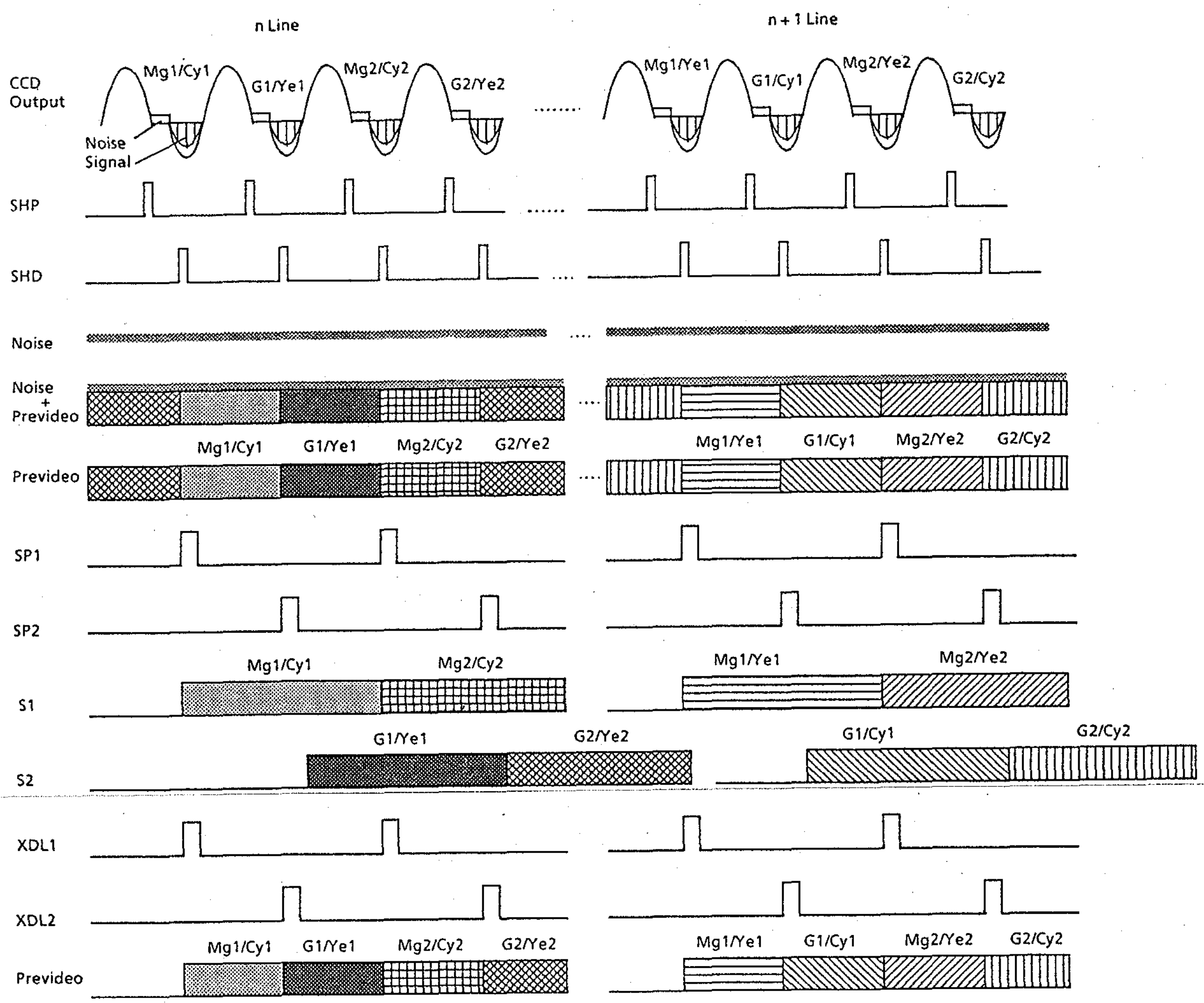

n Line
n + 1 Line
CCD Output
Noise
Signal
Mg1/Cy1
G1/Ye1
Mg2/Cy2
G2/Ye2
Mg1/Ye1
G1/Cy1
Mg2/Ye2
G2/Cy2
SHP
SHD
Noise
Noise + Prevideo
Prevideo
SP1
SP2
S1
S2
XDL1
XDL2
Prevideo

Fig. 3-2 Waveform of Sample Hold

3-5 Blemish/Spot Compensation Circuit

IC1 is a ROM IC used for the compensation of spots or blemishes on the CCD image sensor. The position of spots/blemishes is memorized in the IC1 and this information is sent IC2. The sample pulse 1 (SP1) and sample pulse (SP2) supplied through pins 18 and 19 of IC2 are corrected inside IC2 which means that SP1 and SP2 which coincide with the position of the spots/blemishes are not generated. Therefore, the spots/blemishes are skipped from the sampling, i.e., they are not detected and not displayed. Since the sample pulses are inhibited for the duration of the spot, the value of the previous pixel is held by IC3, and therefore substituted.

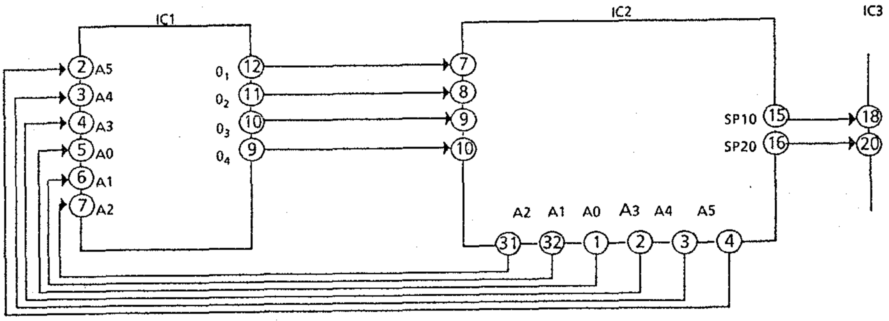
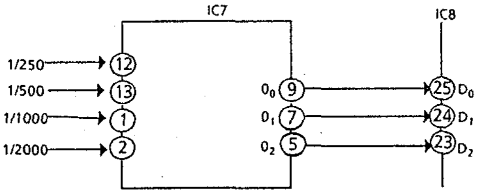

IC1
IC2
IC3
② A5
③ A4
④ A3
⑤ A0
⑥ A1
⑦ A2
O1 ⑫
O2 ⑪
O3 ⑩
O4 ⑨
⑦
⑧
⑨
⑩
SP10 ⑮
SP20 ⑯
⑱
⑳
A2 A1 A0 A3 A4 A5
(31) (32) ① ② ③ ④

Fig. 3-3 Blemish/Spot Compensation Circuit

3-6 Shutter Control Circuit

This circuit consisting of IC7 receives shutter control signal from shutter speed selection switch on the Shutter board. The shutter control signal is supplied to pins 1, 2, 12 and 13 of IC7.

The output signals corresponding to shutter control signal are obtained at pins 5, 7 and 9, those signals are supplied through pins 23, 24 and 25 of IC8 to set the shutter mode.


IC7
IC8
1/250
1/500
1/1000
1/2000
⑫
⑬
①
②
O_0 ⑨
O_1 ⑦
O_2 ⑤
㉕ D_0
㉔ D_1
㉓ D_2

	1/250	1/500	1/1000	1/2000
O_0	L	L	H	H
O_1	L	H	L	H
O_2	H	H	L	L

Fig. 3-4 Shutter Control Circuit

3-7 Automatic Iris Control Circuit

The AIC amplifier consists of IC5 (a) and IC5 (b).

The AIC detect signal is supplied to pin 6 (-) of IC5 (b) and amplified by IC5 (b).

Then it is sent from pin 7 of IC5 (b) to the drive coil of the lens iris in order to open/close the lens iris.

The induced voltage (it occurs by moving the lens iris inside the damper coil.) is fed from the lens damper coil to pin 3 (+) of IC5 (a) and amplified by IC5 (a). Then the amplified signal is fed from pin 1 of IC5 (a) to pin 6 of IC5 (a) to damp the lens iris hunting.

The AIC level is controlled by VR3 (ALC LEVEL).

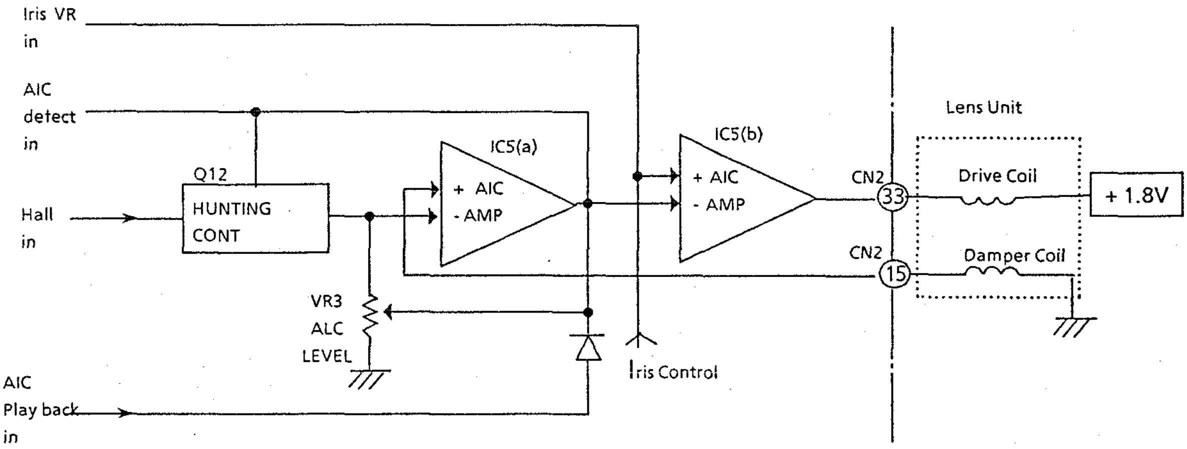

Iris VR in
AIC detect in
Hall in
AIC Play back in
Q12
HUNTING CONT
IC5(a)
+ AIC
- AMP
IC5(b)
+ AIC
- AMP
VR3
ALC
LEVEL
Iris Control
CN2 ㉝
CN2 ⑮
Lens Unit
Drive Coil
Damper Coil
+ 1.8V

Fig. 3-5 AIC Control Circuit

4. Sync Board

4-1 Gen-Lock Sync Circuit

When a black burst signal is supplied to the Gen-Lock Input connector in the Gen-Lock Adaptor WV-AD36,the external sync and burst signal from the Gen-Lock adapter are supplied to this circuit for gen-lock/external sync mode. The gen-lock sync signal is supplied to Bust Eliminator IC9, where the burst component is removed and then supplied to pin 7 of IC7. When it is fed to pin 7 of IC7, the sync generator IC7 is converted into the gen-lock/external sync mode and pulses synchronized with the gen-lock sync signal are generated.
The sync signal comes out from IC9 is then supplied to integrator consisting of R79 to R81, C64 and C65 to remove horizontal component. The vertical (v) component thus detected is fed through vertical reset generator IC4 (b) and Q6 to pin 62 of IC7 to reset it vertically.
As a result, sync generator generates V. pulses synchronized with V component of gen-lock signal.
The gen-lock burst signal is supplied to Burst Gate IC9, where the burst signal is detected by the burst gate pulse supplied from Burst Gate Generator IC4 (c) (d) and the detected burst signal is supplied to pin 43 of IC7, and the sync generator generates the sub carrier (sC) signal synchronized with the detected burst signal.

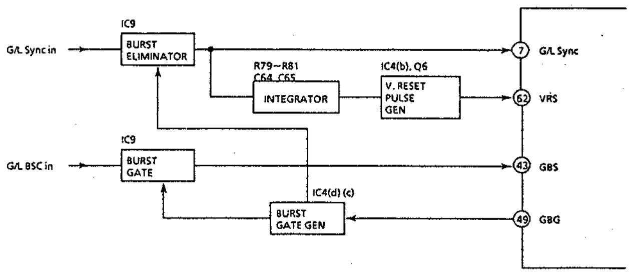


Fig 4-1 Gen-Lock Sync Circuit

4-2 Sync Generator Circuit

This circuit receives 17.7MHz signal in internal sync mode or external sync mode and generates all sync signals used in the camera.
The pin identification of sync generator IC7 is as follows.

MB87075A / SYNC LSI
Pin Identification

Pin No.	Name	In/Out	Description
1	GLC		
2	VB1	-	Not Used
3	VDD1	In	+ 5V DC Power
4	GIE	-	Not Used
5	NP	In	NTSC/PAL Select
6	IEO	Out	Internal/External mode Output
7	GSY	In	Gen-lock Sync Input
8	VDD1	In	+ 5V DC Power Input
9	VSS1	-	Ground
10	TST1	-	Not Used
11	TST2	-	Not Used
12	TST3	-	Not Used
13	TST4	-	Not Used
14	VSS1	-	Ground
15	EBI	-	Not Used
16	PBI	-	Not Used
17	EBO	-	Not Used
18	PBO	-	Not Used
19	GSE	-	Not Used
20	VSS2	-	Ground
21	VDD2	In	+ 5V DC Power
22	SPD	Out	Phase Detect Output for SC
23	SVI	In	External 17.7MHz Input
24	SVO	Out	External 17.7MHz Output
25	OSI	In	Internal 17.7MHz Input
26	OSO	Out	Internal 17.7MHz Output
27	VSS2	-	Ground
28	VDD3	In	+ 5V DC Power
29	GSC		SC Phase
30	VSS2	-	Ground
31	VDD4	In	+ 5DC Power
32	S2C		
33	VSS4	-	Ground
34	VDD5	In	+ 5V DC Power
35	S1C		Color Bar Phase-2 Control
36	VSS5	-	Ground
37	VDD6	In	+ 5V DC Power
38	P2C	-	
39	VSS6	-	Ground
40	VDD1	In	+ 5V DC Power
41	GC2	In	External Sub carrier Phase Control-2
42	GC1	In	External Subcarrier Phase Control-1
43	GBS	In	Gen-lock Burst Input
44	SHC	In	Not Used
45	SC1	Out	Subcarrier-1 Pulse
46	SC2	Out	Subcarrier-2 Pulse
47	PSQ	Out	PAL SQ
48	BFP	Out	Burst Flag Pulse
49	GBG	Out	Burst Gate Pulse
50	ZBR	-	Not Used
51	BSC	-	Not Used
52	VSS1	-	Ground
53	VDD1	In	+ 5V DC Power
54	ALX	-	
55	AL1	-	Not Used

56	ALC	Out	ALC Gate Pulse
57	FLM	Out	Color Frame Pulse
58	VDR	Out	Vertical Drive Pulse
59	VST	Out	Vertical Start Pulse
60	VBL	-	
61	VIS	-	Not Used
62	VRS	In	V Reset Input
63	HB1	-	Not Used
64	VDD1	In	+ 5V DC Power
65	VSS1	-	Ground
66	HB2	-	Horizontal Blanking Width
67	HRS	-	Not Used
68	HD	Out	Horizontal Drive pulse
69	CP	Out	Clamp pulse
70	HWS	-	Not Used
71	FH	-	Not Used
72	BCP	-	Not Used
73	VSS1	-	Ground
74	VDD1	In	+ 5V DC Power
75	HPE	-	Not Used
76	GPE	-	Not Used
77	VSS7	-	Ground
78	VDD7	In	+ 5V DC Power
79	HPC	In	+ 5V DC Power
80	VSS8	-	Ground
81	VDD8	In	+ 5V DC Power
82	GPC	In	Gen-Lock H Phase DC
83	VSS9	-	Ground
84	VDD9	In	+ 5V DC Power
85	HPI	In	VCO for H Lock Input
86	HPO	-	Not Used
87	HPD	Out	Phase Detect for H Lock
88	PVI	In	
89	PVO	Out	
90	PVD	Out	
91	LTP	-	Not Used
92	VDD1	In	+ 5V DC Power
93	VSS1	-	Ground
94	VWS	-	Not Used
95	CVS	-	Not Used
96	CSB	Out	Composite System Blanking Pulse
97	CPB	-	Not Used
98	CSY	Out	Composite Sync Pulse
99	VSS1	-	Ground
100	VB2	In	Vertical Blanking Width

4-3 Indicator Generator Circuit

This circuit generates a zebra signal from signals which exceed a specified level (100%). This zebra (slant stripe) signal is supplied to the EVF.

The zebra video signal from the Process board is supplied to pin 4 of comparator IC13 (a). It is compared with the DC voltage set by VR2 (ZEBRA LEVEL) and the compared signal obtained at pin 12 is fed to pin 2 of NAND gate IC14 (a).

The SC1 signal from the sync generator IC7 is supplied to 1/4 fsc generator IC12 (a) and (b). The 1/4 SC signal 1.1MHz obtained at pin 8 of IC12 (b) is fed to pin 1 of NAND gate IC14 (a) and generates the zebra signal.

The zebra signal obtained at pin 3 of IC14 (a) is fed to pin 4 of IC14 (b) and the zebra control signal from the video select circuit, the fade control circuit IC13 (b) or SW1 (LEVEL INDICATOR SWITCH) on the Microprocessor board is supplied to pin 2 of IC14 (a).

When a low level signal is supplied to pin 4 of IC13 (a), the zebra signal is not fed out.

When a high level is supplied to pin 4 of IC13 (a), the zebra signal obtained at pin 5 of IC14 (b) is fed to pin 9 of IC14 (c).

The zebra select signal from the Microprocessor board is supplied to pin 10 of IC14 (c) and the selected zebra signal is fed to the viewfinder signal control circuit and mixed with the viewfinder video signal.

The zebra signal is also fed to the vertical start pulse (Vp) mix circuit Q11/Q12.

The zebra signal is mixed with the Vp pulse and fed to the EVF/Camera Remote Connector through the Audio board.

When the fade button is pressed, the fade control signal from the Microprocessor board is supplied to pin 10 of comparator IC13 (b) and a reference DC voltage is supplied to pin 9 of IC6 (b).

The output signal from pin 7 of IC13 (b) is fed to pin 2 of IC14 (a) and controls the zebra signal.

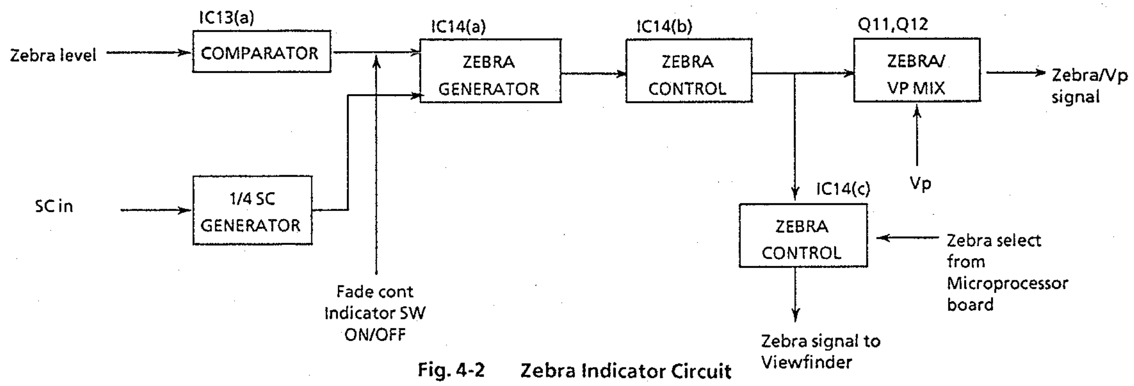

IC13(a)
Zebra level
COMPARATOR
IC14(a)
ZEBRA GENERATOR
IC14(b)
ZEBRA CONTROL
Q11,Q12
ZEBRA/ VP MIX
Zebra/Vp signal
SC in
1/4 SC GENERATOR
IC14(c)
Vp
ZEBRA CONTROL
Zebra select from Microprocessor board
Fade cont
Indicator SW
ON/OFF
Zebra signal to Viewfinder

Fig. 4-2 Zebra Indicator Circuit

4-4 Viewfinder Signal Circuit

The EVF video signal from the Process board is supplied to the amplifier circuit inside IC11 through pin 16. The amplified video signal obtained at pin 14 is fed to the viewfinder through the video/line view signal select circuit and buffer inside IC11 from pin 25.

When the portable VTR is set into the playback mode, the playback signal riding on a DC voltage is supplied from the VTR. The playback signal is removed by C75 and the remaining DC voltage is fed to the playback detect circuit inside IC11 through pin 9. The detected control signal obtained at pin 18 is fed to the Microprocessor board.

The playback signal is also fed to the amplifier circuit through the Process board and pin 16 of IC11.

The amplified playback signal obtained at pin 14 of IC11 is sent to the viewfinder through pin 13, the video/line view select circuit and buffer inside IC11 to pin 25.

The playback control signal from the Microprocessor board is supplied to the playback control circuit inside IC11 through pin 19. The control signal is then fed to the lens through pin 21 of IC11 and closes the lens iris, through pin 8 of IC11 and stops the zebra signal.

When the camera is connected to the RCU Adaptor and Remote Control Unit (RCU) and the RCU is set to the color bar position, the color bar signal from the RCU Adaptor is supplied to the amplifier circuit inside IC11 through pin 16. The amplified color bar signal obtained at pin 14 is fed to the viewfinder through pin 13, the video/line view select circuit, buffer and pin 25 of IC11.The color bar control signal from Microprocessor board is supplied to Q17 to close lens iris.

The color bar control signal is also sent to Zebra indicator generator circuit to stop the Zebra signal.

When the camera is connected to the RCU Adaptor, RCU and studio lens, and the line view signal is connected to the RCU and the RET switch on the studio lens is set to the ON position, the line view signal from the RCU is supplied to the line view select circuit inside IC11 through the RCU Adaptor and pin 12 of IC11.

At the same time, line view control signal is supplied through line view control circuit to line view select circuit inside IC11.

The line view signal obtained at pin 11 is fed to the viewfinder through pin 10 of the video/line view select circuit, the buffer and pin 25 of IC11. The line view control signal is also fed to the base of Q9 and turns OFF Q9 and stops the video signal.

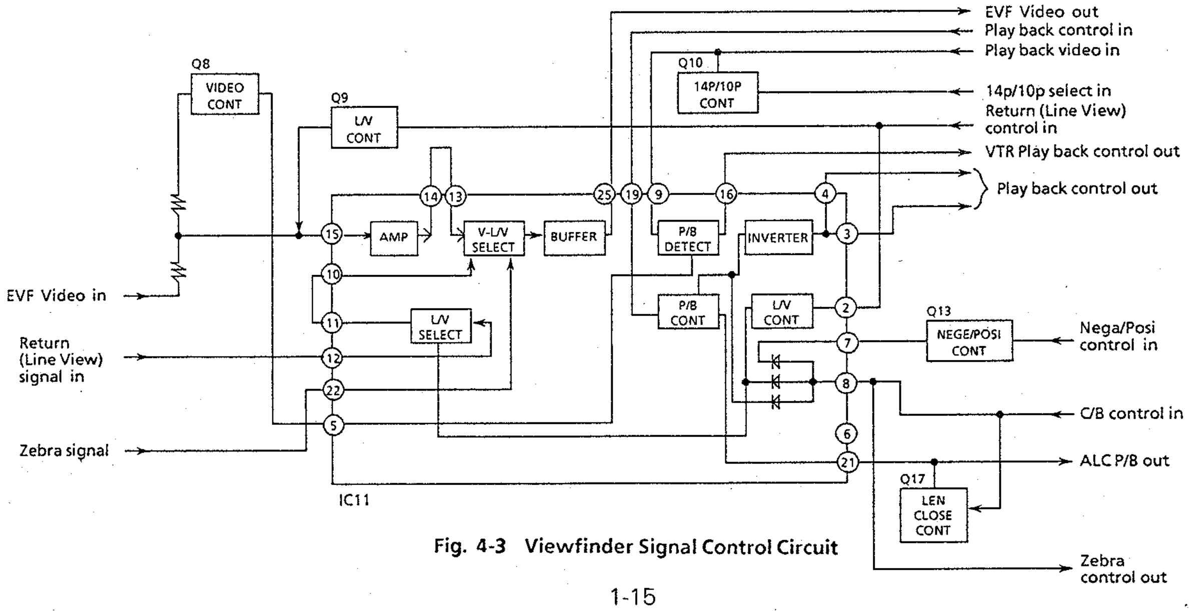

EVF Video out
Play back control in
Play back video in
Q8
VIDEO CONT
Q9
L/V CONT
Q10
14P/10P CONT
14p/10p select in
Return (Line View) control in
VTR Play back control out
Play back control out
14
13
25
19
9
16
4
15
AMP
V-L/V SELECT
BUFFER
P/B DETECT
INVERTER
3
10
P/B CONT
L/V CONT
2
11
L/V SELECT
Q13
NEGE/POSI CONT
Nega/Posi control in
7
12
8
22
C/B control in
6
5
21
ALC P/B out
Q17
LEN CLOSE CONT
EVF Video in
Return (Line View) signal in
Zebra signal
IC11
Zebra control out

Fig. 4-3 Viewfinder Signal Control Circuit

5. Process Board

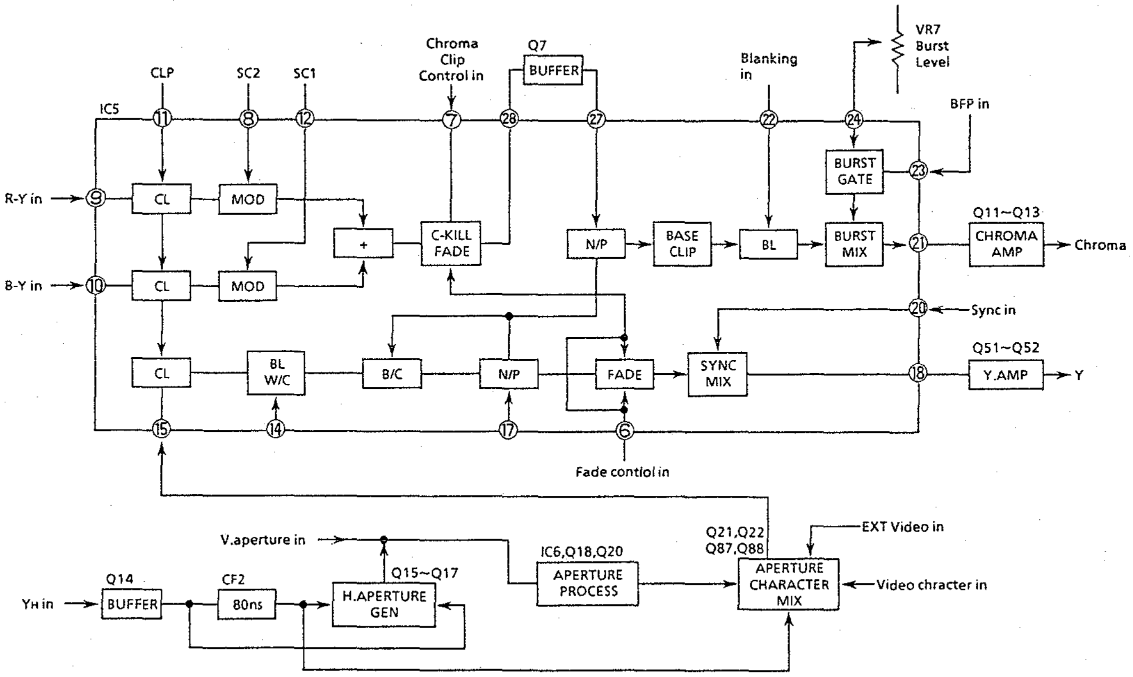

CLP
SC2
SC1
Chroma Clip Control in
Q7
BUFFER
Blanking in
VR7 Burst Level
BFP in
IC5
⑪
⑧
⑫
⑦
㉘
㉗
㉒
㉔
㉓
R-Y in
⑨
CL
MOD
+
C-KILL FADE
N/P
BASE CLIP
BL
BURST GATE
BURST MIX
㉑
Q11~Q13
CHROMA AMP
Chroma
B-Y in
⑩
CL
MOD
⑳
Sync in
CL
BL W/C
B/C
N/P
FADE
SYNC MIX
⑱
Q51~Q52
Y.AMP
Y
⑮
⑭
⑰
⑥
Fade contlol in
V.aperture in
IC6,Q18,Q20
APERTURE PROCESS
Q21,Q22
Q87,Q88
APERTURE CHARACTER MIX
EXT Video in
Video chracter in
YH in
Q14
BUFFER
CF2
80ns
Q15~Q17
H.APERTURE GEN

Fig. 5-1 Aperture/Encoder Circuit

5-1 Horizontal Aperture Generator Circuit

This circuit generates the horizontal aperture signal for enhancing the horizontal resolution.

When the camera is aimed at an object (A) for example, the Y_H signal supplied from Process sub board is fed through Q14 to H.aperture generator consisting of Q15 ~ Q17 as a non-delayed Y_H signal (B). The Y_H signal (B) is also supplied to 80 nsec delay line CF2 and a 80 nsec-delayed Y_H signal (C) is fed to the H.aperture generator. The Y_H signal (D) is reflected back through CF2 to H.aperture generator and delayed again (160 nsec). In the H.aperture generator, the 80 nsec-delayed Y_H signal (C) is amplified and mixed with the non-delayed Y_H signal (B) and 160 nsec-delayed Y_H signal (D). As a result, a H.aperture signal (E) is obtained at collector of Q17, where it is mixed with the vertical edge signal. The H.aperture and V.edge signal are then supplied through aperture process circuit consisting of IC6, Q18, Q20 to aperture character mix circuit consisting of Q21, Q22, Q87 and Q88, where 80 nsec delayed YH signal is mixed with H.V aperture signals and character signal (F).

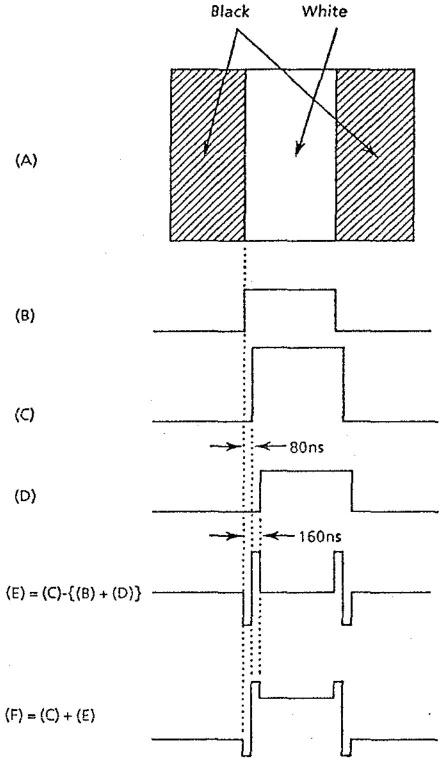

Black
White
(A)
(B)
(C)
80ns
(D)
160ns
(E) = (C)-{(B) + (D)}
(F) = (C) + (E)

Fig. 5-2 Horizontal Aperture Signal

5-2 Encoder Circuit

R-YL and B-YL signals are supplied through pins 9 and 10 of IC5 to Clamp circuit and modulation circuit, where these signals are modulated by 4.43MHz subcarrier SC1 and SC2. The modulated signals are mixed and supplied through chroma killer/fade circuit, buffer Q7, nega/posi, base clip, blanking to burst mix, where modulated chroma signal is mixed with burst signal.

The burst signal obtained at pin 24 of IC5 is then supplied through chroma amplifier Q11 ~ Q13 to pin 5 of IC7.

The YH signal at pin 15 of IC5 is supplied through clamp, blanking, nega/posi, fade circuits to sync mix, where the Y signal is mixed with sync signal.

The sync signal obtained at pin 18 of IC5 is then supplied through Y amplifier Q50 ~ Q52 to pin 2 of IC7.

5-3 Color bar/Camera Selection Circuit

This circuit selects color bar signal supplied from RCU or video signal and selected signal is supplied to S-VHS connector, 10/14 pin connectors and 32 pin connector.

In normal mode, Y signal is supplied through pins 2 ~ 15 of IC7 to Y/Chroma mix circuit, Chroma signal is supplied through pins 5 ~ 4 of IC7 to Y/Chroma mix circuit, where Y signal and chroma signal are mixed to produce composite video signal. The composite video signal is then fed to EXT character mix circuit IC10, where it is mixed with external character signal. The signal obtained at pin 6 of IC10 is then supplied through composite video amplifier (Q76 ~ Q78), video ON/OFF control (Q44) to 32 pin video output (Q45 ~ Q49).

The Y signal obtained at pin 15 of IC7 is supplied through S-connector Y output (Q25 ~ Q27) to S-VHS connector.

The Chroma signal obtained at pin 4 of IC7 is supplied through S-connector chroma output (Q23, Q24) to S-VHS connector.

The Comp-Y/C select signal selects whether both Y and C signals should be supplied to 14 pin VTR connector or not.

The color bar control signal selects the color bar signal instead of camera video signal.

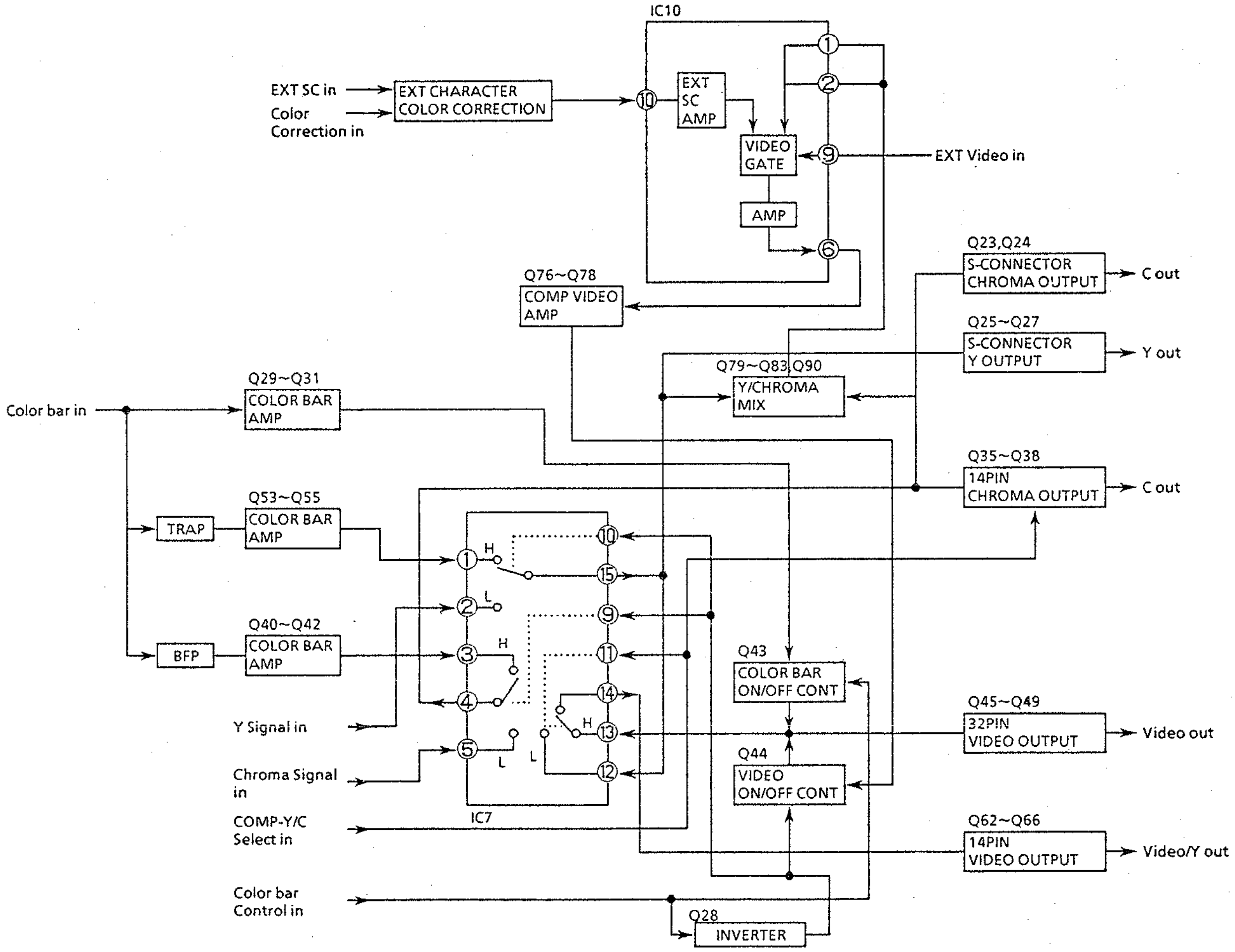

IC10
EXT SC in
Color Correction in
EXT CHARACTER COLOR CORRECTION
EXT SC AMP
VIDEO GATE
AMP
EXT Video in
Q23,Q24
S-CONNECTOR CHROMA OUTPUT
C out
Q76~Q78
COMP VIDEO AMP
Q25~Q27
S-CONNECTOR Y OUTPUT
Y out
Q79~Q83,Q90
Y/CHROMA MIX
Q29~Q31
COLOR BAR AMP
Color bar in
Q35~Q38
14PIN CHROMA OUTPUT
C out
Q53~Q55
TRAP
COLOR BAR AMP
Q40~Q42
BFP
COLOR BAR AMP
H
L
Q43
COLOR BAR ON/OFF CONT
Q45~Q49
32PIN VIDEO OUTPUT
Video out
Y Signal in
Chroma Signal in
Q44
VIDEO ON/OFF CONT
COMP-Y/C Select in
IC7
Q62~Q66
14PIN VIDEO OUTPUT
Video/Y out
Color bar Control in
Q28
INVERTER

Fig. 5-3 Color Bar/Camera Selection Circuit

6. Process Sub Board

6-1 B-Y_L/R-Y_L Processing Circuit

This circuit receives S1 and S2 signals and generates R-YL/B-YL signals for chroma signal and generates vertical aperture signal.

The S1 and S2 signals are supplied to IC1. The color differential signal is made by S1-S2 and supplied through delay line of IC6 to switch to make R-Y_L and B-Y_L signals.

The luminance signal is made by S1 + S2 and supplied through delay line of IC7 to matrix circuit. From matrix circuit, R,G and B signals are obtained.

They are supplied to blanking mix circuit IC2,where blanking period of the signals are cleaned up. They are then supplied through white balance, pedestal and gamma circuits to matrix, Where R-Y_L and B-Y_L signals obtained on the other hands, non-delayed Y_L signal and 2H delayed signal are mixed and divided into half level. This signal minus 1H delayed Y_L signal makes vertical aperture signal.

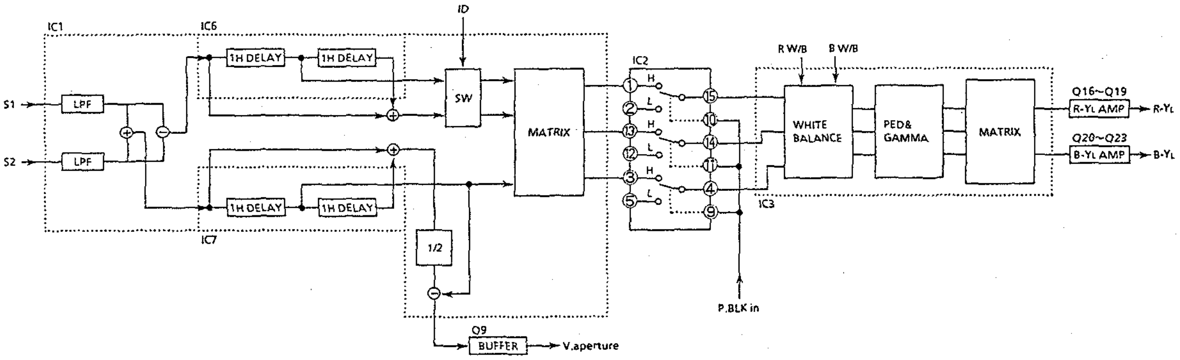

IC1
IC6
ID
S1
S2
LPF
LPF
1H DELAY
1H DELAY
1H DELAY
1H DELAY
IC7
SW
MATRIX
1/2
Q9
BUFFER
V.aperture
IC2
H
L
H
L
H
L
① ② ⑬ ⑫ ③ ⑤ ⑮ ⑩ ⑭ ⑪ ④ ⑨
P.BLK in
R W/B
B W/B
WHITE BALANCE
PED& GAMMA
MATRIX
IC3
Q16~Q19
R-YL AMP
R-YL
Q20~Q23
B-YL AMP
B-YL

Fig. 6-1 B-Y_L/R-Y_L Processing Circuit

6-2 Y Signal Processing Circuit

The modulated Y_H signal is supplied to CF1 to eliminate modulation signal and Q1. The signal is supplied through pin 44 , clamp and gamma correction circuits inside IC1. The corrected signal obtained pin 46 of IC1 is then supplied through amplifier (Q2,Q3), buffer (Q5,Q6) and 1H delay line (IC4,CF2) and 1H delayed signal is supplied through pin48, gain control, clamp circuits inside IC1. The signal obtained at pin 5 of IC 1 is supplied to Y_H amplifier and Y pedestal control circuits respectively.

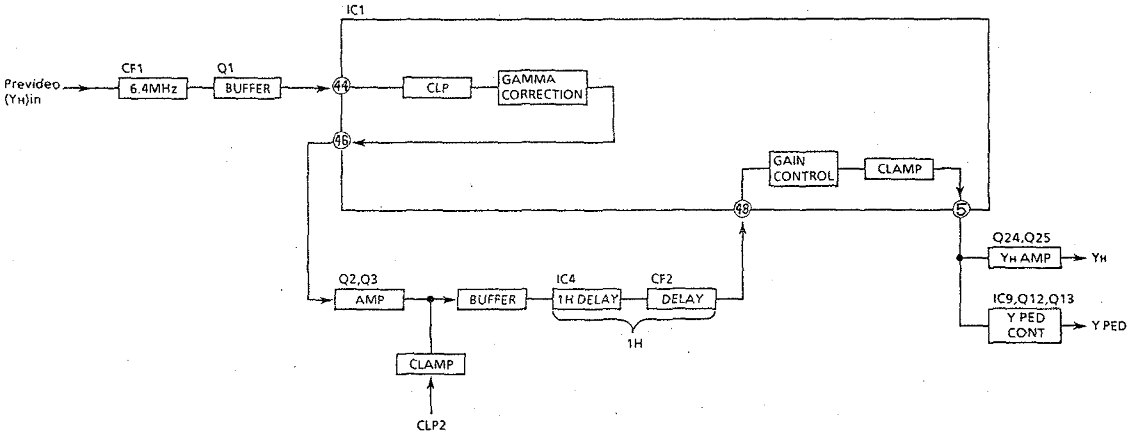

IC1
Prevideo (YH)in
CF1
6.4MHz
Q1
BUFFER
44
CLP
GAMMA CORRECTION
46
GAIN CONTROL
CLAMP
48
5
Q24,Q25
YH AMP
YH
IC9,Q12,Q13
Y PED CONT
Y PED
Q2,Q3
AMP
BUFFER
IC4
1H DELAY
CF2
DELAY
1H
CLAMP
CLP2

Fig. 6-2 Y Signal Processing Circuit

7. Microprocessor Board

7-1 Microprocessor & D/A output circuit

The microprocessor circuit is consisting of IC10 (Microprocessor) and IC1 (Character Generator) and others. The pin identifications and functions of the character generator IC1 and microprocessor IC10 are described in Table 7-1 and 7-2 respectively.

IC3 M50450FP
Pin identifications

Pin No.	Name	In/Out	Descriptions
1	Vss	------	Ground
2	Ac	------	Not Used
3	OSC1	In	Clock pulse generator
4	OSC2	Out	Clock pulse generator
5	R	Out	R character output (VBS + EVF)
6	G	------	Not used
7	NC	------	Not used
8	B	Out	B character output (EVF only)
9	BLNK	------	Not used
10	Out	------	Not used
11	HOR	In	H sync input
12	NC	------	Not used
13	NC	------	Not used
14	VERT	In	V sync input
15	TEST	------	Not used
16	BCK	------	Ground
17	A3	In	Data input Bus-3
18	NC	------	Not used
19	A2	In	Data input Bus-2
20	A1	In	Data input Bus-1
21	A0	In	Data Input Bus-0
22	CK	In	Data clock input
23	CS	In	Chip select input
24	VDD	In	+5V power supply input

Table 7-1 Pin identification of IC1 (Character Gen.)

IC10 MN17581CCD
Pin identification

Pin No.	Name	In/Out	Descriptions
1	PC3/SB0A	Out	Serial data output for VTR or RCU
2	RST	In	Reset in
3	SYNC	Out	Not used
4	X2	Out	Clock pulse generator
5	X1/TCIA	In	Clock pulse generator
6	Vcc	------	Ground
7	OSC2	Out	Clock pulse generator
8	OSC1	In	Clock pulse generator
9	VDD	In	+5V in
10	TCIB	In	+5V in
11	IRQ0	In	Serial clock in from VTR or RCU
12	IRQ1	In	V sync in
13	P00	In	Serial clock in from VTR or RCU
14	P01	Out	Keyboard control H : REC, PLAY, INSERT L : other than REC, PLAY, INSERT
15	P02	Out	F-VTR display
16	P03	Out	Tally cancel output
17	P10	Out	REC start/pause output H : STOP, L : RUN (START)
18	P11	Out	Standby/on output H : STANDBY, L : ON
19	P12	Out	Nega/Posi control H : NEGA, L : POSI
20	P13	Out	Pan.Tilt/Zoom Focus Select control H : Pan.Tilt, L : Zoom Focus
21	P20	Out	Zoom Tele
22	P21	Out	Zoom Wide
23	P22	Out	Color bar/Video select control H : Video, L : Color bar
24	P23	Out	Key scanning output
25	P30	In	AWC R H : UP, L : DOWN
26	P31	In	AWC B H : UP, L : DOWN
27	P32	Out	IC1 power ON/OFF H : OFF, L : ON
28	P33	Out	Output for "CS" of IC1
29	P40	Out	Pan.right
30	P41	Out	Pan.left
31	P42	Out	Tilt down
32	P43	Out	Tilt up
33	P50	Out	AWC R/B, FADE, R/B GAIN, IRIS, PED
34	P51	Out	AWC R/B, FADE, R/B GAIN, IRIS, PED
35	P52	Out	AWC R/B, FADE, R/B GAIN, IRIS, PED
36	P53	Out	AWC R/B, FADE, R/B GAIN, IRIS, PED
37	P60	Out	AWC R/B, FADE, R/B GAIN, IRIS, PED
38	P61	Out	AWC R/B, FADE, R/B GAIN, IRIS, PED
39	P62	Out	AWC R/B, FADE, R/B GAIN, IRIS, PED
40	P63	Out	AWC/ATW selection output H : ATW, L : AWC
41	P70	Out	Zebra selection output L : Zebra ON
42	P71	Out	Tally output H : REC

43	P72	Out	Playback DC output H : Playback
44	P73	Out	Zoom speed control H : FAST
45	P80	Out	D/A converter control output for "A0" of IC6
46	P81	Out	D/A converter control output for "A1" of IC6
47	P82	Out	D/A converter control output for "A2" of IC6
48	P83	Out	Key scanning pulse output, Data output for "CK" of IC1
49	P90	Out	Key scanning pulse output, Data output for "A0" of IC1
50	P91	Out	Key scanning pulse output, Data output for "A1" of IC1
51	P92	Out	Key scanning pulse output, Data output for "A2" of IC1
52	P93	Out	Key scanning pulse output, Data output for "A3" of IC1
53	EXPS	In	+5V
54	PA0	In	Key scanning pulse input
55	PA1	In	Key scanning pulse input
56	PA2	In	Key scanning pulse input
57	PA3	In	Key scanning pulse input
58	PB0	In	Standby/On control H : STANDBY L : ON
59	PB1	In	Camera power ON/OFF control H : ON, L : OFF
60	PB2/SBTB	In	Serial clock input from camera remote controller
61	PB3/SBIB	In	Serial data input from camera remote controller
62	PC0/SB0B	Out	Not used
63	PC1/SBTA	In	Serial clock input from VTR or RCU
64	PC2/SBIA	In	Serial data input from VTR or RCU

Table 7-2 Pin identification of IC10 (Microprocessor)

First, the programmed signals (key scan pulses) are supplied from P23, P83, P90, P91, P92 and P93 to the input interface circuits.

Then, these programmed signals are supplied from the input interface circuits to input ports PA0, PA1, PA2 and PA3 through switches and transistors. (Refer to Fig. 7-2 Input matrix circuit.)

According to the programmed signals at input ports PA0, PA1, PA2 and PA3, the microprocessor identifies the instruction and supplies the instructional signals (P83, P90,P91, P92 and P93) to character generator IC1 and other output terminals of IC10.

o Serial Data Circuit

The serial data is fed from the VTR or RCU to pin 64 (PC2/SBIA) of IC10 so that the microprocessor identifies the instruction as from the VTR or RCU. The serial data is sent from pin 1 (PC3/SBIA) of IC10 to the VTR or RCU.

The serial data is fed from camera remote controller to pin 61 (PB3/SBIB) of IC10 so that the microprocessor identifies the instruction as from the camera remote controller.

The character select circuit consisting of IC1 and IC10 controls the output characters for EVF video and PAL output.

When the character select signal which is supplied from pin 28 (P33) of IC10 to pin 23 (CS) is low (L), the character can be written into IC1. When character select signal is high (H), the character can not be written.

Standby detector Q19 detects whether the camera is ON or in standby.

When the camera standby switch is ON, a high level supplied from the Control board turns Q2 off and a low (L) level is fed to pin 58 (PB0) of IC10 so that the low level of power ON/OFF control obtained pin 27 (P32) turns Q6 on and +5V power is supplied to pin 24 of IC1.

When the standby switch is in standby, Q6 is turned off so that the power is not supplied to pin 24 of IC1.

The programmed signals (key scan pulses) are supplied from the output ports P23, P83, P90 ~ P93 to matrix circuits so that the programmed signals are returned to the input ports PA0-PA3 through diodes/switches, in the matrix circuit.

The microprocessor IC10 will know the function of the camera by detecting the returned programmed signal.

According to the signals at the input ports of the microprocessor IC10, the microprocessor supplies the graphics instructions to the character generator IC1 and the remote control instructions to the VTR.

o Character Generator

The clock pulse frequency of IC1 is adjusted by VR1 (CHARACTER SIZE).

The display characters consists of top and bottom portions. The display characters obtained at pins 5 (R OUT) and 8 (B OUT) are fed to the Process Board for PAL output and AF/Alarm mixing circuit for EVF display respectively.

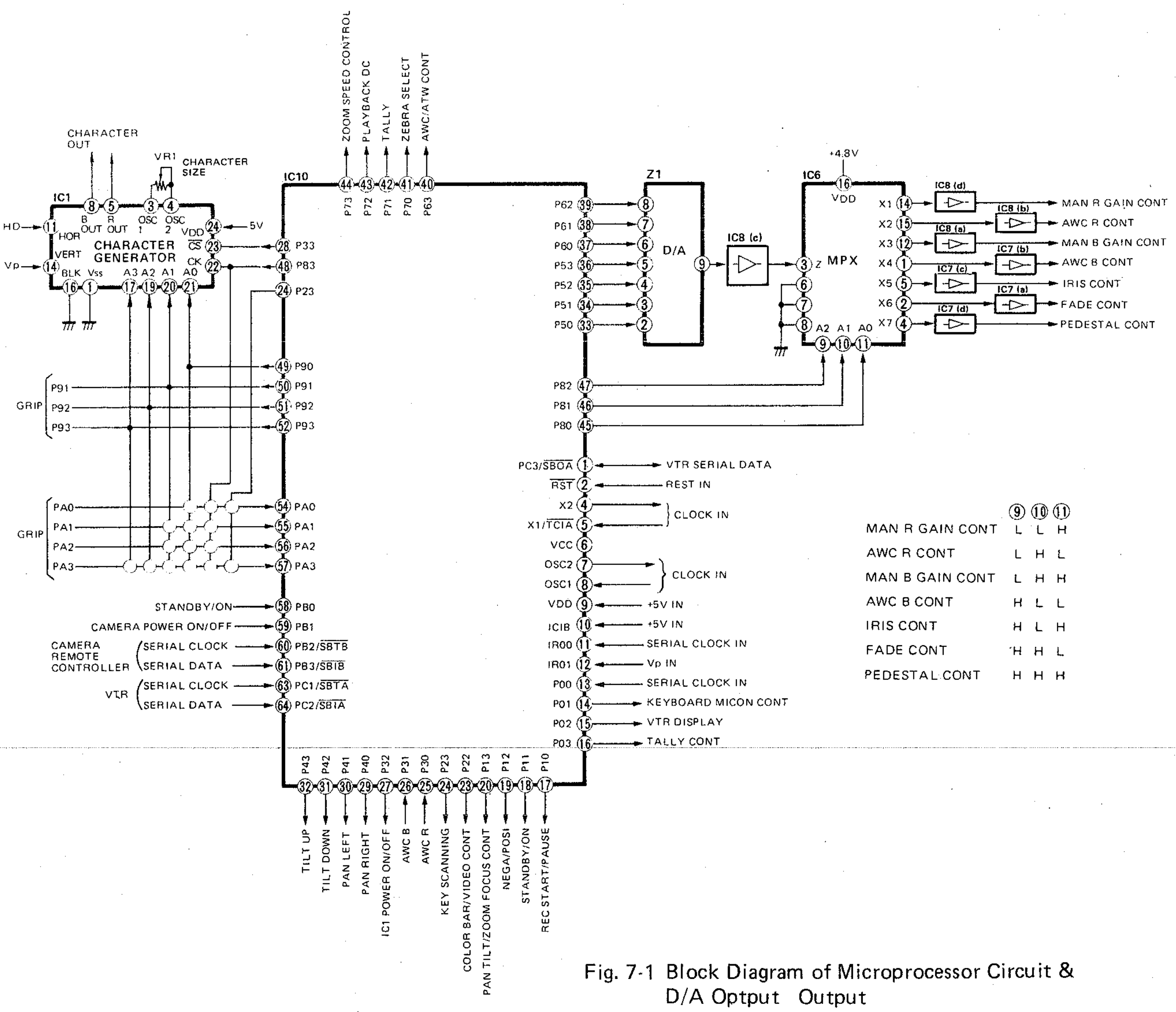
The 4 bit input data supplied to pins 21 (A0), 20 (A1), 19 (A2) and 17 (A3) of IC1 is written when pin of 23 (CS) is set low (L) and a clock pulse is supplied to pin 22 (CK).

The output obtained pin 8 (B OUT) contains alarm (top portion) and the pin 5 (R OUT) contains title/date/time characters.

o D/A Output

The AWC (Automatic White Balance Control) R/B signal, Fade control signal, R/B GAIN signal, IRIS control signal and PED (Pedestal) signal obtained on output ports pins 33 (P50), 34 (P51), 35 (P52), 36 (P53), 37 (P60), 38 (P61) and 39 (P62) of IC10 are supplied to pin 3 (z) of multiplex IC6 through a digital/analog converter resistor block Z1 and buffer IC8 (a).

The output DC control voltage for AWC R, AWC B, Fade, R Gain, B Gain, Iris and Pedestal obtained on output pins 15, 1, 2, 14, 12, 5 and 4 respectively are fed to the Process Board and AIC control circuit.


CHARACTER OUT
VR1
CHARACTER SIZE
IC1
HD
Vp
HOR
VERT
BLK
Vss
B OUT
R OUT
OSC 1
OSC 2
VDD
5V
CHARACTER GENERATOR
CS
CK
A3 A2 A1 A0
IC10
P33
P83
P23
P90
P91
P92
P93
GRIP
P91
P92
P93
GRIP
PA0
PA1
PA2
PA3
STANDBY/ON
CAMERA POWER ON/OFF
CAMERA REMOTE CONTROLLER
SERIAL CLOCK
SERIAL DATA
VTR
SERIAL CLOCK
SERIAL DATA
PB0
PB1
PB2/SBTB
PB3/SBIB
PC1/SBTA
PC2/SBIA
ZOOM SPEED CONTROL
PLAYBACK DC
TALLY
ZEBRA SELECT
AWC/ATW CONT
P73 P72 P71 P70 P63
P62
P61
P60
P53
P52
P51
P50
Z1
D/A
IC8 (c)
+4.8V
IC6
VDD
MPX
Z
A2 A1 A0
X1 X2 X3 X4 X5 X6 X7
IC8 (d)
IC8 (b)
IC8 (a)
IC7 (b)
IC7 (c)
IC7 (a)
IC7 (d)
MAN R GAIN CONT
AWC R CONT
MAN B GAIN CONT
AWC B CONT
IRIS CONT
FADE CONT
PEDESTAL CONT
P82
P81
P80
PC3/SBOA
RST
X2
X1/TCIA
VCC
OSC2
OSC1
VDD
ICIB
IR00
IR01
P00
P01
P02
P03
VTR SERIAL DATA
REST IN
CLOCK IN
CLOCK IN
+5V IN
+5V IN
SERIAL CLOCK IN
Vp IN
SERIAL CLOCK IN
KEYBOARD MICON CONT
VTR DISPLAY
TALLY CONT
P43 P42 P41 P40 P32 P31 P30 P23 P22 P13 P12 P11 P10
TILT UP
TILT DOWN
PAN LEFT
PAN RIGHT
IC1 POWER ON/OFF
AWC B
AWC R
KEY SCANNING
COLOR BAR/VIDEO CONT
PAN TILT/ZOOM FOCUS CONT
NEGA/POSI
STANDBY/ON
REC START/PAUSE

	⑨	⑩	⑪
MAN R GAIN CONT	L	L	H
AWC R CONT	L	H	L
MAN B GAIN CONT	L	H	H
AWC B CONT	H	L	L
IRIS CONT	H	L	H
FADE CONT	H	H	L
PEDESTAL CONT	H	H	H

Fig. 7-1 Block Diagram of Microprocessor Circuit & D/A Optput Output

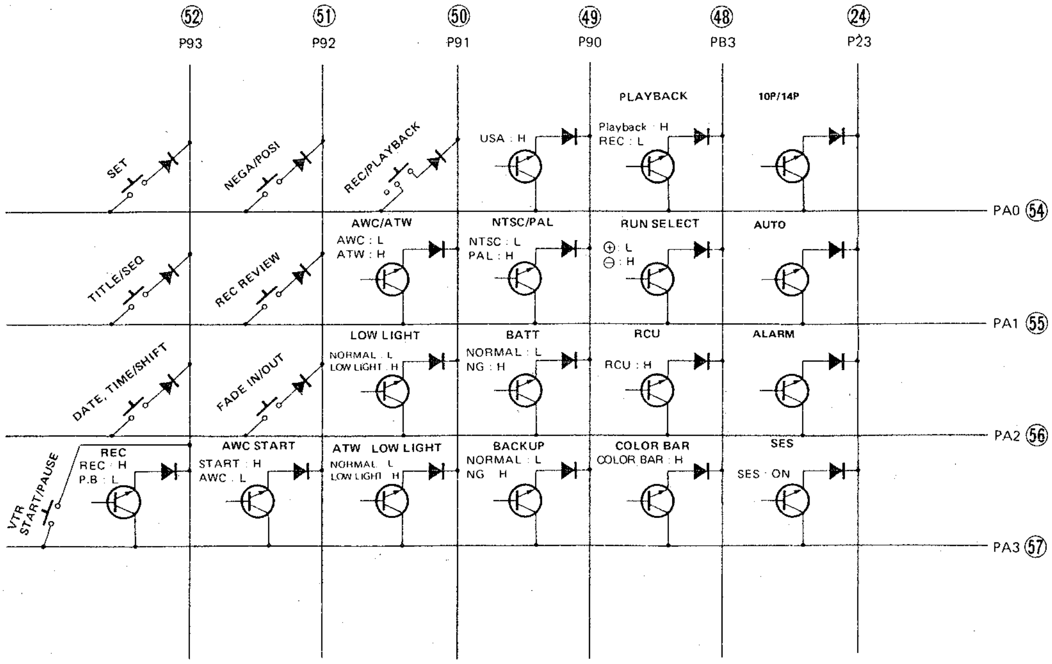

(52) P93
(51) P92
(50) P91
(49) P90
(48) PB3
㉔ P23
SET
NEGA/POSI
REC/PLAYBACK
USA : H
PLAYBACK
Playback : H
REC : L
10P/14P
PA0 (54)
TITLE/SEQ
REC REVIEW
AWC/ATW
AWC : L
ATW : H
NTSC/PAL
NTSC : L
PAL : H
RUN SELECT
⊕ : L
⊖ : H
AUTO
PA1 (55)
DATE, TIME/SHIFT
FADE IN/OUT
LOW LIGHT
NORMAL : L
LOW LIGHT : H
BATT
NORMAL : L
NG : H
RCU
RCU : H
ALARM
PA2 (56)
VTR START/PAUSE
REC
REC : H
P.B : L
AWC START
START : H
AWC : L
ATW LOW LIGHT
NORMAL : L
LOW LIGHT : H
BACKUP
NORMAL : L
NG : H
COLOR BAR
COLOR BAR : H
SES
SES : ON
PA3 (57)

Fig. 7-2 Input Matrix Circuit

8. Power Board

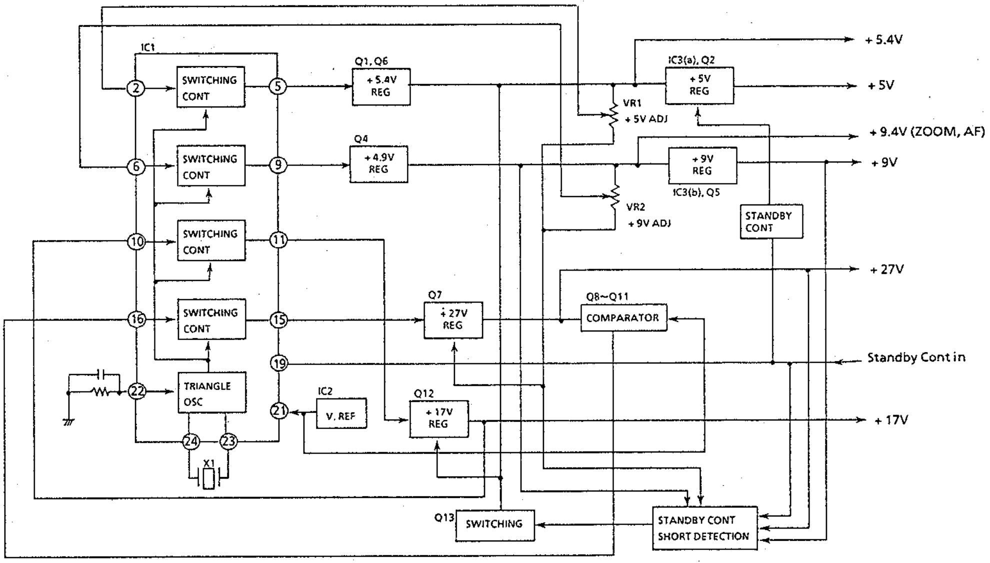

IC1
SWITCHING CONT
SWITCHING CONT
SWITCHING CONT
SWITCHING CONT
TRIANGLE OSC
②
⑥
⑩
⑯
㉒
⑤
⑨
⑪
⑮
⑲
㉑
㉔
㉓
X1
IC2
V. REF
Q1, Q6
+5.4V REG
Q4
+4.9V REG
Q7
+27V REG
Q12
+17V REG
Q13
SWITCHING
Q8~Q11
COMPARATOR
STANDBY CONT SHORT DETECTION
IC3(a), Q2
+5V REG
VR1
+5V ADJ
+9V REG
IC3(b), Q5
VR2
+9V ADJ
STANDBY CONT
+5.4V
+5V
+9.4V (ZOOM, AF)
+9V
+27V
Standby Cont in
+17V

Fig. 8-1 Regulator Circuit

8-1 + 5.4V/ + 9.4V Regulator Circuit

This circuit generates the regulated + 5.4V DC and + 9.4V DC from + 12V unregulated DC power by using switching pulse generated inside IC1 and they are supplied to other circuits.
The voltage fluctuation of + 5.4V DC and + 9.4 V DC are supplied through pins 2 and 6 to respective error amplifiers inside switching control circuits of IC1, where they are compared with reference voltage. The compared signals are then supplied to comparator, where they are compared with triangle pulse supplied from triangle osc. As a result, width of switching pulses come out from pins 5 and 9 are controlled so that both + 5.4V DC and + 9.4V DC are kept constant.

8-2 + 25V/-17V regulator Circuit

This circuit generates regulated + 27V DC and + 17V DC from regulated + 9.4V DC and + 27V DC by using switching pulse generated inside IC1 and they are supplied to other circuits.
The voltage fluctuation of + 27V DC and + 17V DC are supplied through pins 16 and 10 to respective error amplifiers inside switching control circuits of IC1, where they are compared with reference voltage. The compared signals are then supplied to comparator, where they are compared with triangle pulse supplied from triangle OSC. As a result, width of switching pulses come out from pins 15 and 11 are controlled so that both + 27V DC and + 17V DC are kept constant.

8-3 + 5V Regulator Circuit

This circuit consisting of IC3 (a) and Q2 generates regulated + 5V DC from regulated + 5.4V DC and supplied to other circuits.

8-4 + 9V Regulator Circuit

This circuit consisting of IC3 (b) and Q5 generates + 9V DC from regulated + 9.4V DC and supplied to other circuits.

8-5 Standby Control/Short Detection Circuits

- **Standby control circuit**

When standby switch located on the side of camera is set to standby mode, high potential is supplied through pin 11 of CN1 to pin 19 of IC1 and IC1 stops working except switching control for + 5.4V regulator circuit. This + 5.4V DC is used for sync and microprocessor boards.
On the other hand, high potential is also fed to base of Q3 and Q3 turns ON. As a result, + 5V regulator circuit also stop working.

- **Short Detection circuit**

This circuit detects short condition of regulator circuits in the Power board and protect the circuits by stopping operation of each regulator circuit. For example, if + 5V regulator circuit becomes short condition by some reason, low potential is supplied to IC4 and output from IC4 also becomes low potential, which is supplied to base of Q13 and makes it off. As a result, high potential obtained at collector of Q13 is supplied to + 5.4V/ + 9.4V/ + 27V/ + 17V regulator circuit and the voltages of each regulator circuit fed back to switching control of IC1 also become high potential and all switching control stop.

9. Audio Board

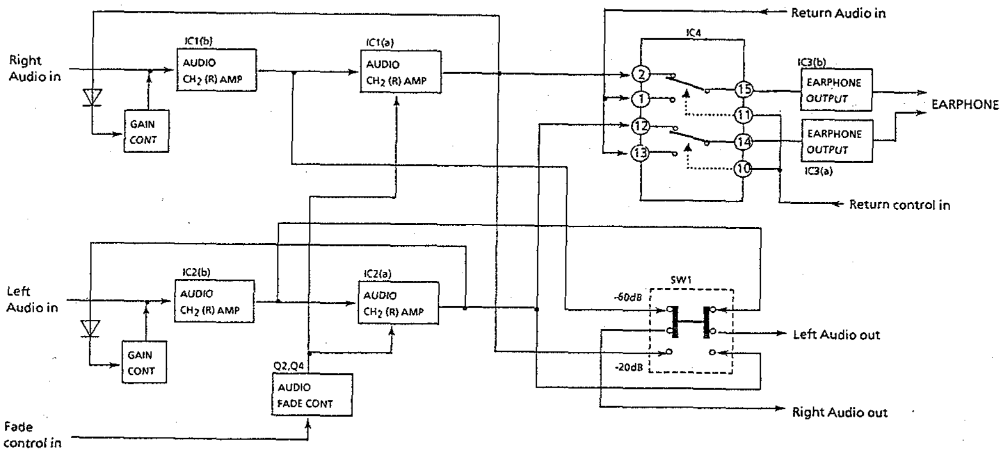


Fig. 9-1 Audio Circuit

This circuit amplifies the output from the mounted microphone or external microphones.

The amplified audio signal is sent out to the VTR for recording and to the earphone jack on the camera for audio monitoring.

The −70dB output for channel-1 (left) or channel-2 (right) from the electret condenser microphone (which is mounted on the camera), or one/two external microphone(s) is/are supplied to audio amplifier consisting of IC1 and IC2 respectively where it/they is/are amplified +50dB.

The −20dB audio output from IC1 (a) (CH2) and IC2 (a) (CH1) are sent to SW1 (AUDIO LEVEL SECTION SWITCH) on the Battery board.

The −60dB audio output from IC1 (b) (CH2) and IC2 (b) (CH1) are also sent to SW1.

SW1 selects the −20dB or −60dB audio signal and the selected signals (CH1 and CH2) are sent to the 10 pin VTR or 14 pin VTR through 10 pin or 14 pin VTR connector.

The −20dB audio signal from IC1 (a) (CH2) and IC2 (a) (CH1) are also fed to D1 and D2 where they are converted into DC voltages. The rectified DC voltages are supplied to the base of Q1 and Q3 to control the resistance between the collector and emitter of Q1 and Q3.

When the audio signal levels from IC1 (a) and IC2 (a) increase, the DC voltage at the base of Q1 and Q3 also increase and resistance between collector and emitter decrease. Therefore, the audio level at pins 5 of IC1 (b) and IC2 (b) decrease.

When the audio signal levels from IC1 (a) and IC2 (b) decrease, the reverse operation takes place.

In this way, the audio signal output level is kept constant.

The audio signal level is also controlled by the fade control signal supplied from the Microprocessor board through pin 31 of CN1 and Q2 and Q4.

IC4 selects audio from microphone or return audio from VTR, and selected audio signal is supplied to earphone.

When return video button either on camera or lens is being pressed, low potential is supplied to control terminals 10 and 11 of IC4, pins 1 and 15 and pins 13 - 14 are connected. As a result, Return video signal is supplied through IC3 (a) (b) to earphone.

The stand by control signal from the Microprocessor board is supplied to the stand-by control Q8 and Q9 through pin 24 of CN2 and the stand by control signal obtained at the collector of Q8 is fed to the 10 pin or 14 pin VTR.

The INT/EXT control signal is fed from the Sync board through buffer Q6/Q7. The tally control signal from the Microprocessor board is supplied to the base of Q5 and the zebra/Vp mixed signal from the Sync board is supplied to the emitter of Q5. The tally control signal obtained at the emitter of Q5 is mixed with the zebra/Vp mixed signal. The mixed signal is fed to the view finder.

SW2 (DC POWER SELECTION SWITCH) selects the camera power as;

EXT :	+12V is fed from AC adaptor WV-PS03, RCU adaptor WV-AD37E or Gen-lock adaptor WV-AD36E
10P or 14P :	+12V is fed from VHS VTR or 3/4" VTR, S-VHS VTR

9-1 Audio Sub Board

The return video signal is fed from VTR through 14 pin VTR connector and pin 4 of CN4 to base of Q1.

When DC Power Selection Switch SW2 is set to either EXT or 10P mode, low potential is supplied through Q10 to gate of Q2 and Q2 turns OFF, as a result, no return video signal is come out from of Q2.

When DC Power Selection Switch SW2 is set to 14P mode, high potential is supplied to gate of Q2 and Q2 turns ON, as a result, the return video signal is fed through Q2 and Sync board to view finder.

Service Manual

System Camera

WV-F15E

Vol. 2

Adjustment Procedures

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1. TEST EQUIPMENT REQUIRED

The following equipment is required for adjustment of WV-F15 colour camera.

- Oscilloscope (dual trace, delayed, 25MHz bandwidth, with three probes)
- Digital voltmeter (DVM)
- Frequency counter
- Vectorscope
- Colour video monitor
- Tripod
- Lighting (140 footcandles (1400 lux), 3200°K)
- Lightmeter
- Logarithmic gray scale chart (Part No. YWV2310RB99) (Fig. 1-1)

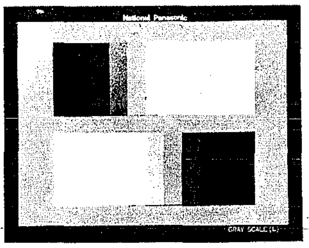


Fig. 1-1

- Coloru chart (Part No. YWV2100RB98) (Fig. 1-2)

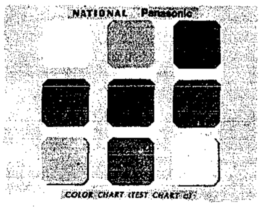
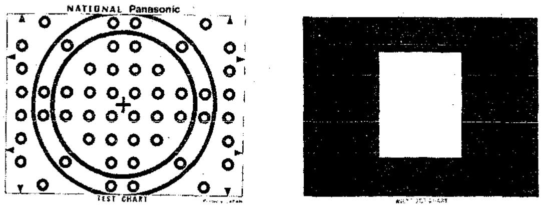


Fig. 1-2

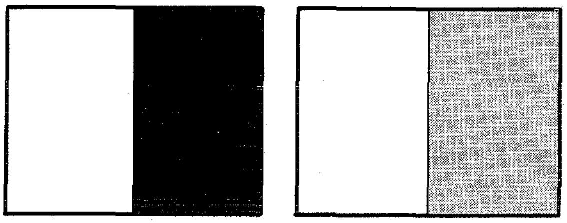
- Ball/White set chart (Part No. YWV2100RB03) (Fig. 1-3)



Front Rear

Fig. 1-3

- White/black and white/gray chart (Part No.YFWV326RB33) for Auto Focus adjustment (Fig.1-4)



Front Rear

Fig. 1-4

- *ND filters for adjustments of Auto Focus and Auto Tracing* White-Balance (ATW)

	1/2ND	1/4ND	1/8ND
KODAK	No.96-0.3	No.96-0.6	No.96-0.9
FUJI	ND-0.3	ND-0.6	ND-0.9
KENKO	ND-50	ND-25	ND-13
HOYA	ND-50	ND-25	ND-13
NIKON	ND2	ND4	ND8

Note : Use the filter of which diameter is more than 58 mmø for 8X Auto Focus Zoom Lens and 72mmø for 12X Auto Iris Zoom Lens.

- Colour temperature conversio filters for adjustments of Auto Tracing White-Balance (ATW)

	Parts No	Description
KODAK	80B	More than 15X20cm (1 sheet)
FUJI	LBB-12	More than 15X20cm (1 sheet)
KENKO	LB-120	More than 72mmø (2 pcs)
HOYA	LB-120	More than 72mmø (2 pcs)
NIKON	B12	More than 72mmø (2 pcs)

- Extention board
  For Drive board (Fig. 1-5) (Part No. VKZF015P5A)
  For Drive board to sensor board (Fig. 1-6) (Part No. V0WEA0131AN)
  For Process board (fig. 1-7) (Part No. VKZF015P6A)
  For Process board to Process sub board
  (Part No. F15EXT26PA) Fig. 1-8
  (Part No. F15EXT10PA) Fig. 1-9
  For Microprocessor board (Fig. 1-10) (Part No. VKZF015P7A)

For Sync board (Fig. 1-11) (Part No. VKZF015P8A)
For Power board (Fig. 1-12) (Part No.VKZF015P9A)
For Audio boared (Fig. 1-13) (Part No.F15EXT60PA)

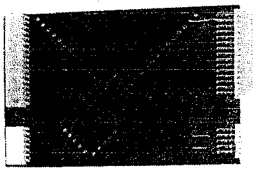


Fig. 1-5

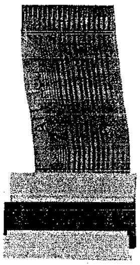


Fig. 1-6

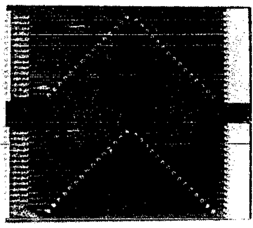


Fig. 1-7

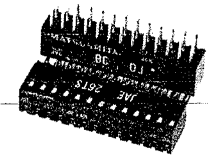


Fig. 1-8

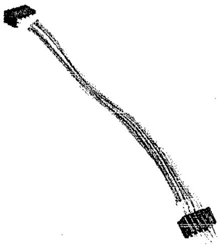


Fig. 1-9

Fig. 1-10

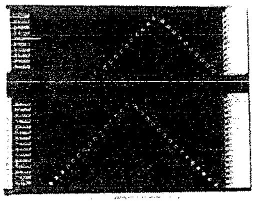


Fig. 1-11

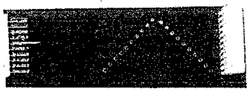


Fig. 1-12

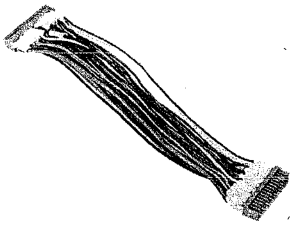
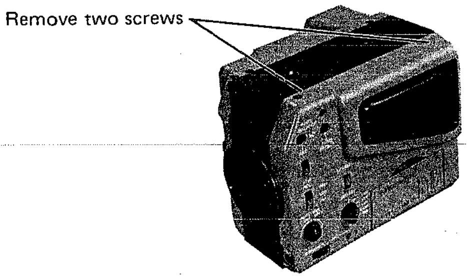


Fig. 1-13

2. DISASSEMBLY PROCEDURE FOR Adjustment

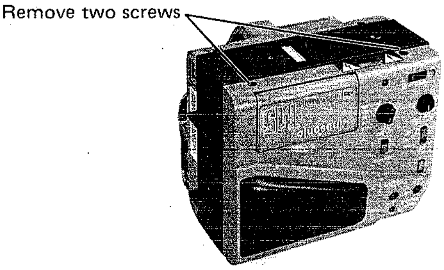
2-1 Camera Unit

- Turn OFF the power.
- Remove the right side cover (viewed from the front) by remounting four fixing screws. (Fig. 2-1-1 to FIg. 2-1-3)



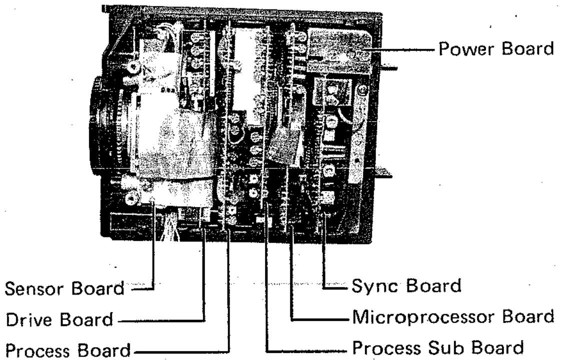
Remove two screws

Fig. 2-1-1



Remove two screws

Fig. 2-1-2



Power Board
Sensor Board
Drive Board
Process Board
Sync Board
Microprocessor Board
Process Sub Board

Fig. 2-1-3

- When adjusting the Drive board, remove the shield cover by two screws and use the extention board. (Fig. 2-1-4)

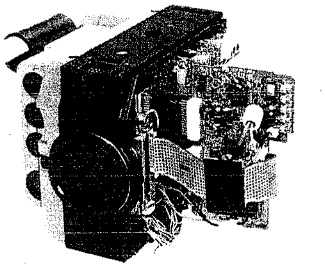


Fig. 2-1-4

- Other extention boards can be adjusted without the extention boards.

Note : When you need extention board for adjustment or repair the camera, we have several extention boards. (Fig. 1-5 to 1-13)

3. REPLACEMENT PROCEDURE

3-1 CCD Image Sensor Replacement

- Disassemble the camera unit as previously described in 2. DISASSEMBLY PROCEDURE FOR ADJUSTMENT on page 2-2.
- Remove the shield cover by removing two screws. (Fig. 3-1-1)

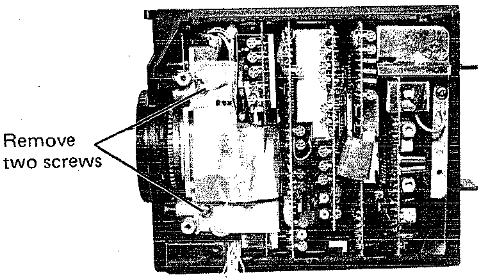


Fig. 3-1-1

- Remove fivePCB boards from the camera unit by pulling. (Fig. 3-1-2)

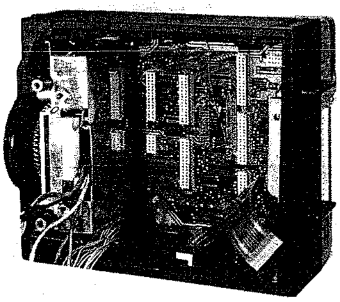


Fig. 3-1-2

Note :
1. Before pulling the SYNC board, remove a ground lead from the chasses.
2. Before pulling the Microprocessor board, disconnect the flexible jumper from the connector CN3 on the Microprocessor board. When disconnecting, pull the outer case of CN3 and then pull the flexible jumper. When connecting the flexible jumper, push the outer case of CN3 after inserting the flexible jumper to CN3.
3. Before pulling the CCD drive board, disconnect the flexible jumper from the connector CN2 on the CCD drive board.

- Remove four screws fixing the left side cover (viewed from the front). (Fig. 3-1-3 and Fig. 3-1-4)

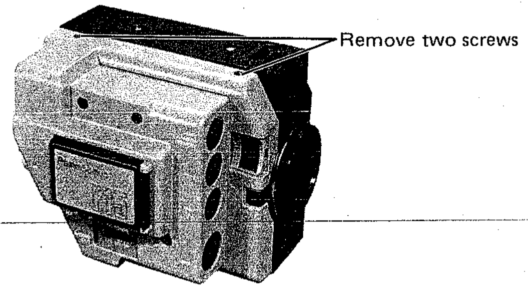


Fig. 3-1-3

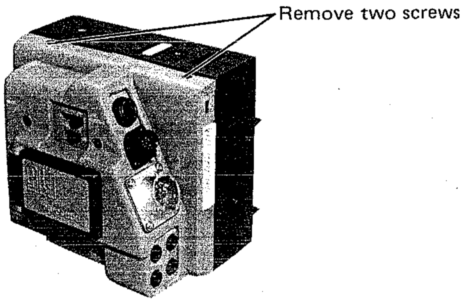


Fig. 3-1-4

- Remove the mother board by removing five screws. (Fig. 3-1-5)

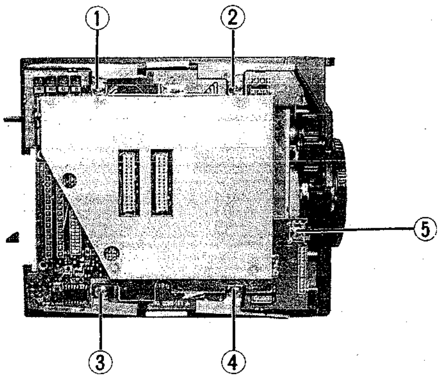


Fig. 3-1-5

- Remove six screws which fix the rear chassis and then remove the rear chassis. (Fig. 3-1-6 and FIG. 3-1-7)

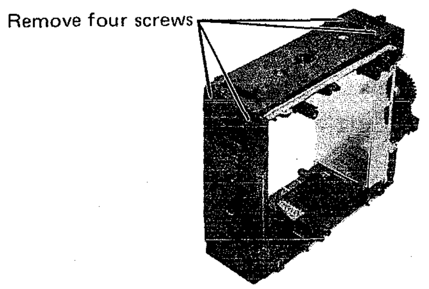

Remove four screws

Fig. 3-1-6

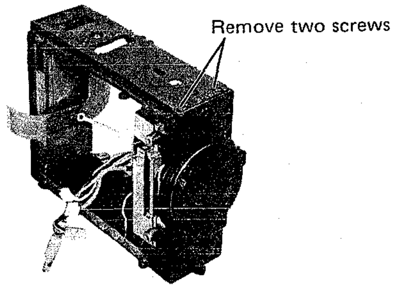

Remove two screws

Fig. 3-1-7

- Remove the shield case by removing two screws. (Fig. 3-1-8)

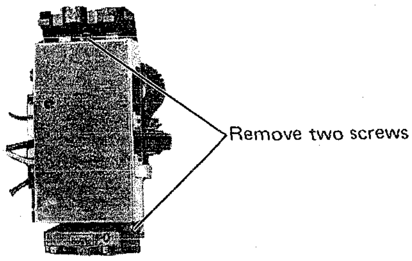

Remove two screws

Fig. 3-1-8

- Pull the sensor board from the front panel. (Fig. 3-1-9)

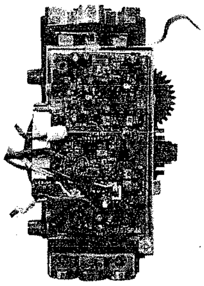


Fig. 3-1-9

- Remove the CCD by removing two screws and install the new CCD. (Fig. 3-1-10)

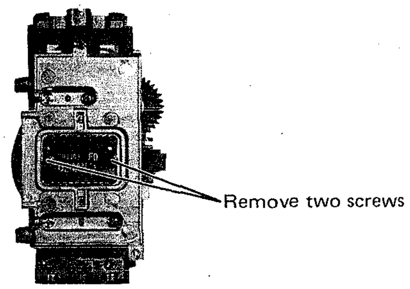

Remove two screws

Fig. 3-1-10

- Assemble the camsea unit in the reverse order of disassembling.

4. DISASSEMBLY PROCEDURE

4-1 Audio Board

- Remove four screws fixing the left side cover (viewed from the fron). (Fig. 3-1-3 Fig. 3-1-4)
- Remove the side cover by four screws. (Fig. 3-1-12)

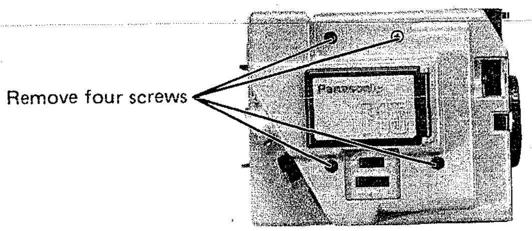

Remove four screws

Fig. 3-1-12

- Remove Audio board and connectors by four screws and unsolder the two jumper wires. (Fig. 3-1-13 and Fig. 3-1-14)

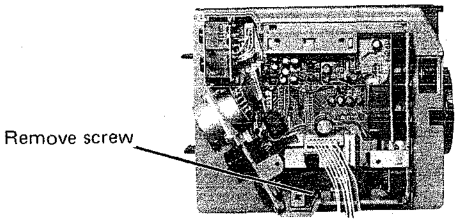

Remove screw

Fig. 3-1-13

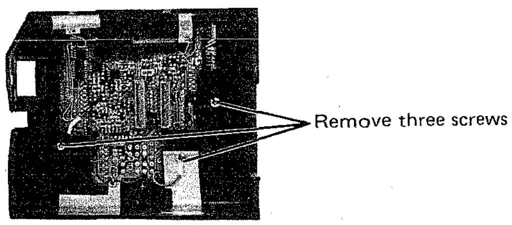

Remove three screws

Fig. 3-1-14

5. ADJUSTMENT PROCEDURE

5-1 Connection and Setting Up for Adjustment

Connection

- Connect the camera cable between the camera and the power supply WV-3203A or mount the AC adaptor WV-PS03 on the camera unit.
- Connect the video cable from the power supply WV-3203A to the colour video monitor through the vectorscope, or connect coaxial cable between the AC adaptor WV-PS03 and the colour video monitor through the vectorscope.
- Terminate the video input of the colour video monitor with 75 ohm. (Fig. 5-1 and Fig.5-2).

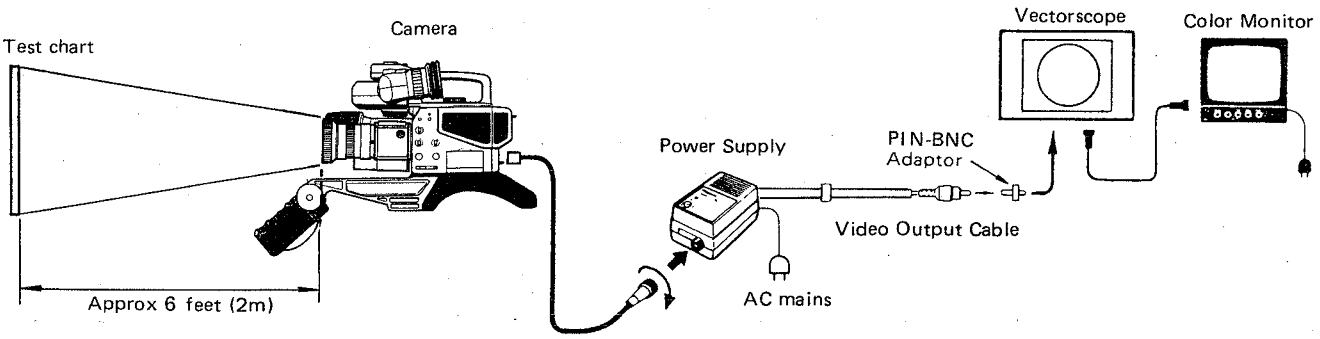

Test chart
Camera
Power Supply
PIN-BNC Adaptor
Vectorscope
Color Monitor
Video Output Cable
AC mains
Approx 6 feet (2m)

Fig. 5-1

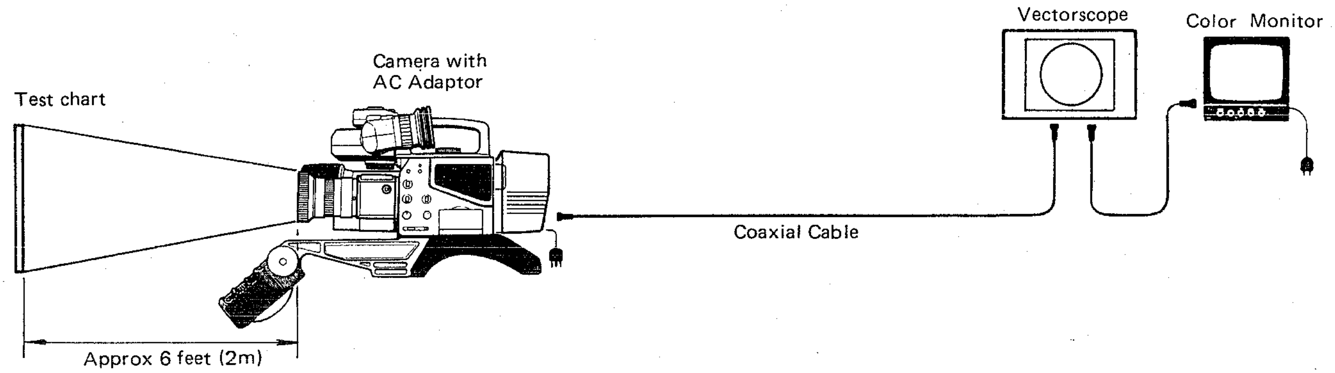

Test chart
Camera with AC Adaptor
Vectorscope
Color Monitor
Coaxial Cable
Approx 6 feet (2m)

Fig. 5-2

Disassembling

- Disassemble the camera according to Section 2 DISASSEMBLY PROCEDURE FOR ADJUSTMENT on page 2-2.

Setting up

- Light: Incident light intensity on chart : 140 footcandles (1400 lux)
  Colour temperature : 3200°K
- Test Charts: Logarithmic gray scale chart (YWV2310RB99)
  Colour chart (YWV2100RB98)
  Flat white chart/paper
  White/black and white/gray chart (YFWV326RB33)
  Ball/White set chart (YWV2100RB03)

Position of controls and switches on the camera

o Set the controls and switches on the camera as follows;

- Right Side -	
Standby switch (SW1) :	Right (ON) position
AGC selection switch (SW2) :	Down (OFF) position
White balance selection switch (SW3) :	Down (ATW) position
Auto iris control (VR2) :	Center (detent) position
SES (Strobe effect shutter)/normal selection switch (SW1) :	Upper (NORMAL) position
Shutter speed selection switch :	1/120
Level indicator switch (SW3) :	Upper (ON) position
Colour adjustment switch :	Down (OFF) position
Red gain control (VR1) :	Mechanical center position
Blue gain control (VR2) :	Mechanical center position
- Left Side -	
Audio level selection switch (SW1) :	Left (-20dB) position
14P output signal selection switch :	Left (COMP) position
DC power selection switch :	Middle (10P) position
- Rear Side -	
VTR compatibility switch (VR1) :	Upper (⊕) position
- Grip Arm -	
Record/playback selection switch :	Lower (REC) position

5-2 Adjustment Procedure

Refer to page 2-18 and 19 for the test points and adjusting controls.

Caution :

1. Do not set the white balance (AWC) during the adjustment. (The blinking WHITE warning indicator should be seen in the viewfinder during adjustment. Install the backup battery for observing the blinking WHITE indicator.) If the automatic white balance is set accidentally, set the White Balance Selection Switch (AWC/ATW) to the AWC position and turn OFF the power switch once to reset the white balance previously set.
2. Aim the camera at the logarithmic gray scale chart or colour chart during the adjustment so that chart fully occupies the raster of the monitor. (Fig. 5-2-1)

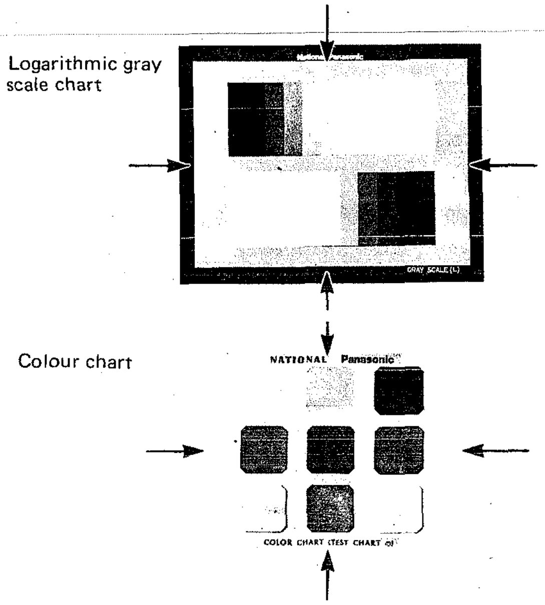


Fig. 5-2-1

5-2-1 Camera Unit Adjustment

(1) + 9.0V Adjustment

Test point:	**TP8 (+ 9.0V)**	**Sync board**
Adjust:	**VR2 (+ 9.0V ADJ)**	**Power board**

- Connect the digital voltmeter (DVM) to TP8 (+ 9.0V).
- Adjust VR2 (+ 9.0V ADJ) for 9.0V ± 0.05V.

(2) + 5.0V Adjustment

Test point :	**TP4 (+ 5.0V)**	**Microprocessor board**
Adjust :	**VR1 (+ 5.0V ADJ)**	**Power board**

- Connect the digital volt meter (DVM) to TP4 (+ 5.0V).
- Adjust VR1 (+ 5.0V ADJ) for 5.0V ± 0.05V.

(3) Subcarrier adjustment

Test point:	**TP5 (SC OUT)**	**Sync board**
Adjust:	**CT3 (SC ADJ)**	**Sync board**

- Connect the frequency counter to TP5.
- Adjust CT3 (SC ADJ) for 4.433619MHz ± 10Hz.

(4) INT H. PLL adjustment

Test point:	**TP1 (INT H. PLL)**	**Sync board**
Adjust:	**CT1 (INT H. PLL)**	**Sync board**

- Connect the oscilloscope to TP1.
- Set the oscilloscope to DC mode.
- Adjust CT1 (INT H. PLL ADJ) for 2.5V ± 0.1V. (Fig. 5-2-2)

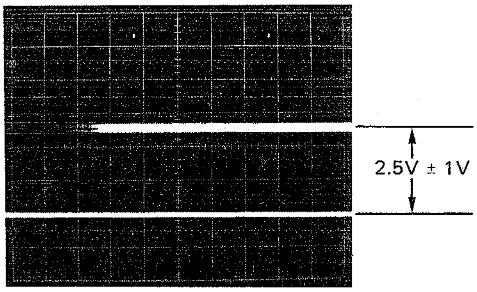


Fig. 5-2-2

(5) EXT H. PLL adjustment

Test point:	**TP2 (EXT H. PLL)**	**Sync board**
Adjust:	**L1 (EXT H. PLL)**	**Sync board**

- Mount the gen-lock adapter WV-AD36 on the camera.
- Supply the colour bar or black burst signal from the signal generator to the gen-lock input connector on the gen-lock adaptor.
- Connect the oscilloscope to TP 2.
- Set the oscilloscope to DC mode.
- Adjust L1 (EXT H. PLL) for 2.5V ± 0.1V. (Fig. 5-2-3)

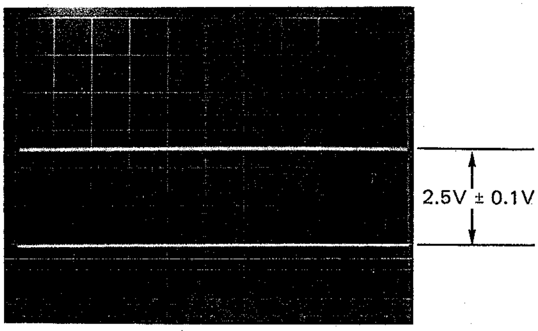


Fig. 5-2-3

(6) SC-lock 1 adjustment

Test point:	**TP4 (SC-lock)**	**Sync board**
Adjust:	**CT2 (ST-lock1)**	**Sync board**

- Mount the gen-lock adaptor WV-AD36 on the camera.
- Supply the colour bar or black burst signal from the signal generator to the gen-lock input connector on the gen-lock adaptor.
- Connect the oscilloscope to TP 4.
- Set the oscilloscope to DC mode.
- Adjust CT2 (SC-lock) for 2.1V ± 0.1V. (Fig. 5-2-4)

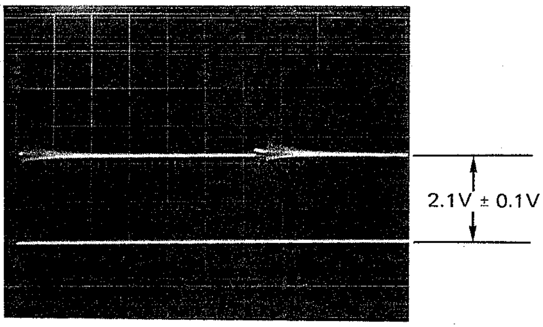


Fig. 5-2-4

(7) SC-lock 2 sub adjustment

Note : This adjustment is only time when item (7) can not adjust 2.1V ± 0.1V.

Test point: **TP4 (SC-lock)** **Sync board**
Adjust: **L5 (SC-lock sub 2)** **Sync board**

- Mount the gen-lock adapter WV-AD36 on the camera.
- Supply the colour bar or black burst signal from the signal generator to the gen-lock input connector on the gen-lock adaptor.
- Connect the oscilloscope to TP 4.
- Set the oscilloscope to DC mode,
- Adjust L5 (SC-lock sub) for 2.1V ± 0.1V. (Fig. 5-2-4)

(8) CCD drive PLL adjustment

Test point : **TP1 (Drive PLL)** **Drive board**
Adjust: **L11 (Drive PLL)** **Drive board**

- Connect the oscilloscope to TP1.
- Set the oscilloscope to DC mode.
- Adjust L11 (CCD drive PLL) for 2.5 ± 0.1V. (Fig. 5-2-5)

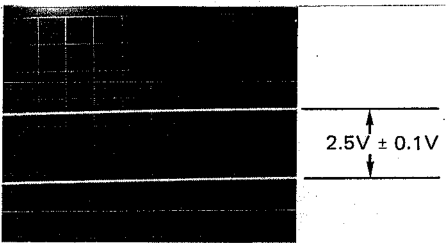


Fig. 5-2-5

(9) V sub adjustment

Test point : **TP1 (V sub)** **Sensor board**
Adjust : **VR5 (V sub)** **Drive board**

- Connect the oscilloscope to TP1.
- Set the oscilloscope to DC mode.
- Adjust VR5 (V sub) so that the voltage to the number which is printed on the rear of CCD.(Fig. 5-2-6)
- The number is shown in the table.

Exs : 9 2 → 9.2V
B 6 → 11.6V
Decimal

Character	A	B	C	D	E	F	G	H	I	J
Voltage	10	11	12	13	14	15	16	17	18	19

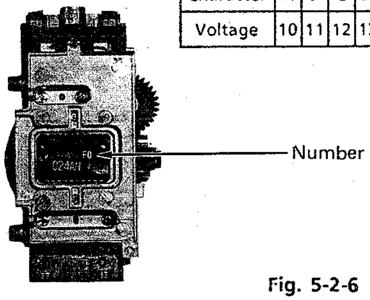


Fig. 5-2-6

(10) ALC level adjustment

Test point : **TP1 (ALC)** **Process board**
Adjust : **VR3 (ALC LEVEL)** **Drive board**

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP1 (ALC).
- Set the oscilloscope to H. rate.
- Adjust VR3 (ALC LEVEL) so that the waveform is 0.2V + 0.02V - 0V from the blanking level to the top step of the gray scale waveform. (Fig. 5-2-7)

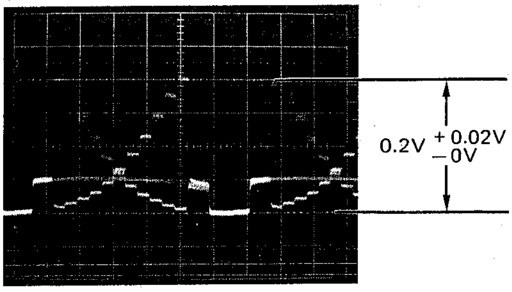


Fig. 5-2-7

(11) AGC adjustment

Test point: **TP6 (Y)** **Process Sub board**
Adjust: **VR1 (AGC Level)** **Drive board**
VR2 (AGC off level) **Drive board**

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP6 (Y OUT).
- Set the oscilloscope to H. rate.
- Set the AGC Selection Switch to the OFF (lower) position.
- Adjust VR2 (AGCoff level) for 0.15V ± 0.01V from the blanking level to the top step of the gray scale waveform. (Fig. 5-2-8)

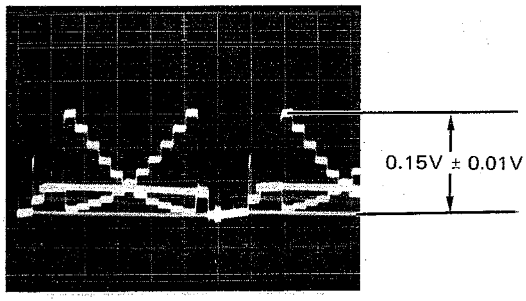


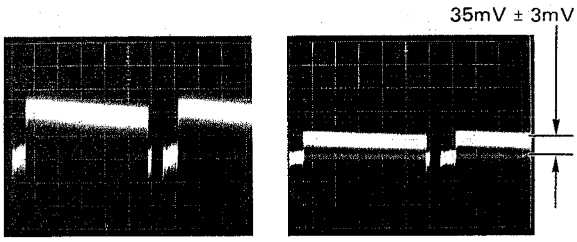
Fig. 5-2-8

- Set the AGC Selection Switch to the (center) position.
- Adjust VR1 (AGC Level) for 0.15V ± 0.01V from the blanking level to the top step of the gray scale waveform. (Fig. 5-2-8)

(12) Pedestal adjustment

Test point:	**TP2 (Y OUT)**	**Process board**
Adjust:	**VR4 (PEDESTAL)**	**Process Sub board**

- Cap on the lens.
- Connect the oscilloscope to TP2 (Y OUT) and terminate the Y OUT with 75ohm.
- Set the oscilloscope to H. rate.
- Adjust VR4 (PEDESTAL) so that the pedestal level at TP6 (Y OUT) becomes 35mV ± 3mV. (Fig. 5-2-9)



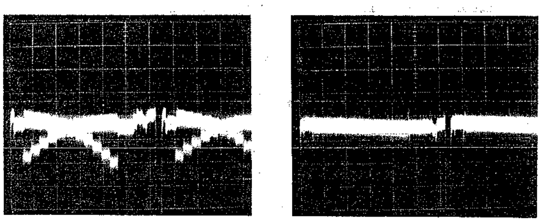
NO GOOD **GOOD**

Fig. 5-2-9

(13) Vertical edge balance adjustment

Test point:	**TP4 (V. Aperture)**	**Process Sub board**
	TP7 (G signal)	**Process Sub board**
Adjust:	**VR3 (V.EDGE BALANCE)**	**Process Sub board**

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP4 (V.Aperture) of the Process Sub board.
- Connect the oscilloscope to TP7 (G signal) of the process sub board.
- Set the oscilloscope to H. rate.
- Adjust VR3 (V. EDGE BALANCE) so that the V. Edge signal becomes minimum and the level of the G signal is kept at 0.5V ± 0.05V. (Fig. 5-2-10, Fig. 5-2-11)



NO GOOD **GOOD**

Fig. 5-2-10

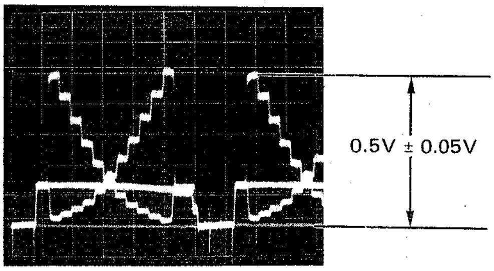


Fig. 5-2-11

(14) YH out adjustment

Test point:	**32 pin of 32 pin connector**	**Process sub board**
Adjust:	**VR1 (YH)**	**Process sub board**

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to 32pin of 32pin connector.
- Set the oscilloscope to H. rate.
- Set the AGC switch to LOW (Middle) position.
- Adjust VR1 (YH) so that the waveform is 0.7 ± 0.05V from the blanking level to the top step of the gray scale waveform. (Fig. 5-2-12)

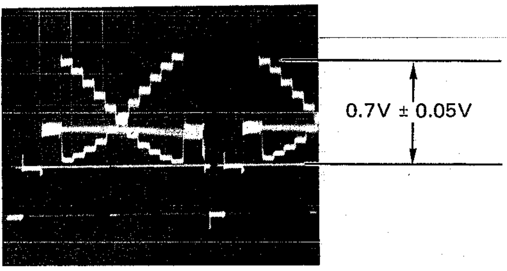


Fig. 5-2-12

(15) Video level adjustment

Test point:	**VIDEO OUT**	
Adjust:	**VR10 (VIDEO OUT)**	**Process board**

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to VIDEO OUT and terminate the VIDEO OUT with 75ohm.
- Set the AGC switch to LOW (middle) position.
- Set the oscilloscope to H. rate.
- Adjust VR10 (VIDEO OUT) for 0.7V ± 0.05V from the blanking level to the top step of the gray scale waveform. (Fig. 5-2-13)

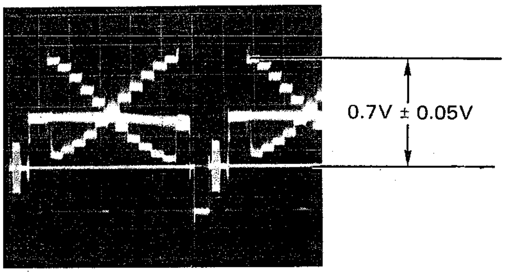


Fig. 5-2-13

(16) Chroma gain adjustment

Test point :	**TP1 (C GAIN)**	**process Sub board**
Adjust :	**VR11 (C GAIN)**	**process Sub board**

- Aim the camera at the chroma chip chart.
- Connect the oscilloscope to TP1 (C GAIN) of process sub board.
- Set the AGC switch to Low (middle) position.
- Adjust VR11 (C GAIN) so that the burst signal is 0.22 ± 0.01Vp-p. (Fig. 5-2-14)

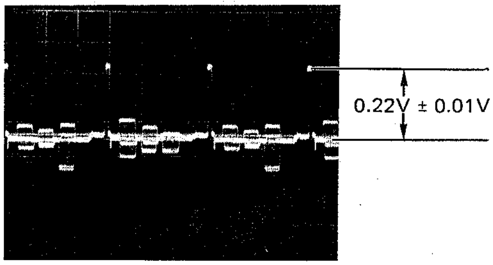
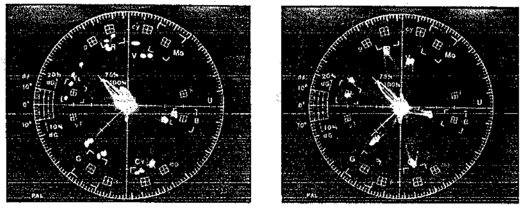


Fig. 5-2-14

(17) Chroma flicker adjustment

Test point :	**Video Out**	
Adjust :	**VR2 (C. Flicker)**	**Process Sub board**

- Connect the Video Output connector to vectorscope.
- Aim the camera at the chroma chip chart.
- Adjust VR2 (C Flicker) so that the chroma flicker become minimum. (Fig. 5-2-15)



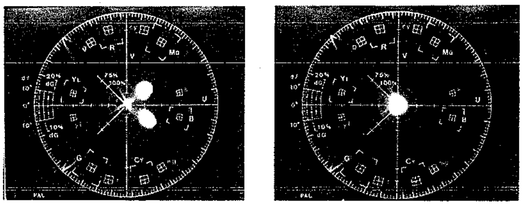
NO GOOD GOOD

Fig. 5-2-15

(18) R-Y/V, B-Y/U carrier balance

Test point :	**Video out**	
Adjust :	**VR9 (R-Y)**	**Process Sub board**
	VR10 (B-Y)	**Process Sub board**

- Cap on the lens.
- Connect the Video Out Connector to vectorscope.
- Connect TP3 (AUTO PRESET) of Microprocessor Board to Ground.
- Adjust the VR9 (R-Y) so that the vector positions at the center of the vectorscope.
- Adjust the VR10 (B-Y) so that the vector positions at the center of the vectorscope. (Fig. 5-2-16)



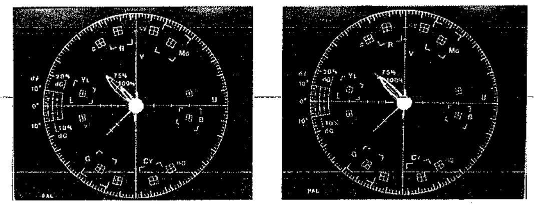
NO GOOD GOOD

Fig. 5-2-16

(19) Burst balance adjustment

Test point :	**Video Output**	
Adjust :	**VR1 (Burst reference)**	**Sync board**

- Aim the camera at the logarithmic gray scale chart.
- Connect the Video Output Connector to vector scope.
- Set the PAL/NTSC mode select switch of vectorscope to NTSC position.
- Adjust VR1 (Burst reference) so that the two burst level becomes same. (Fig. 5-2-17)



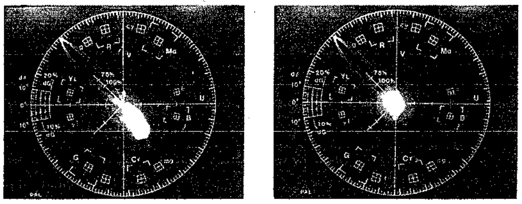
NO GOOD GOOD

Fig. 5-2-17

(20) White balance preadjusment

Test point :	**Video Output**	
Adjust :	**VR2 (B preset)**	**Microprocessor board**
	VR3 (R Preset)	**Microprocessor board**

- Aim the camera at the logarithmic gray scale chart.
- Connect the Video Output Connector to vector scope.
- Connect TP3 (AUTO PRESET) of Microprocessort board to ground.
- Adjust VR2 (B Preset), VR3 (R Preset) so that the vector positions at the center of the vector scope. (fig. 5-2-18)



NO GOOD GOOD

5-2-18

(21) Burst gain adjustment

Test point : **Video output**
Adjust : **VR7 (Burst level)** **Process board**

- Aim the camera at the logarithmic gray scale chart.
- Connect the Video output Connector to oscilloscope and terminate the Video output with 75ohm.
- Adjust VR7 (Burst level) so that the burst level becomes 0.3 ± 0.03Vp-p. (Fig. 5-2-19)

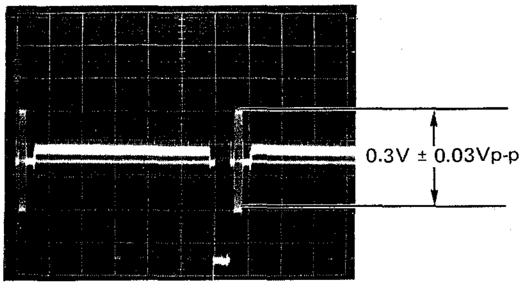


Fig. 5-2-19

(22) Burst reference phase adjustment

Test point : **Video Output**
Adjust : **VR9** **Process board**
(BURST REFERENCE PHASE)

- Mount the RCU adaptor WV-AD37 on the camera unit.
- Supply the DC power to the RCU adaptor using the remote control unit (RCU) WV-RC35 or an external +12V power source.
- Set the DC Power Selection Switch on the left side of camera to the EXT position.
- Connect the Video Output Connector of the RCU adaptor to the colour video monitor through the B input connector of vectorscope.
- Supply the colour bar or black burst signal to the Gen-lock input connector of the RCU adaptor through the B input connector of vectorscope. (Fig. 5-2-20)

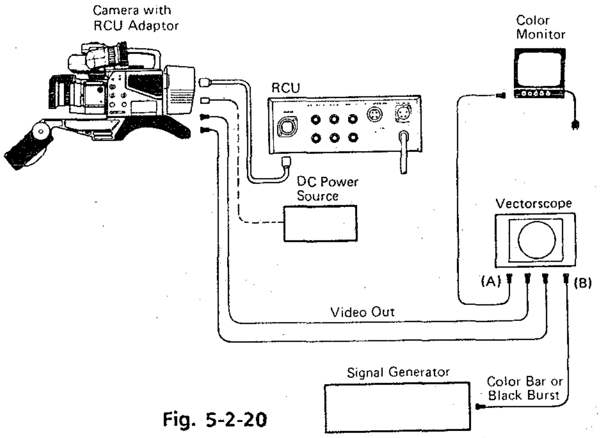


Fig. 5-2-20

- Select the A input signal on the vectorscope and lock the vector by the B input signal.
- Set the Colour Bar/Camera Selection Switch on the RCU adaptor to the BAR position.
- Adjust the Phase Control of the vectorscope so that the burst vectors position on the burst axes of the vectorscope and note the phase of the burst vectors. (Fig. 5-2-21)

  Note : Do not touch the Phase Control of the vectorscope until the adjustment of VR9 (BURST REFERENCE PHASE) is completed.

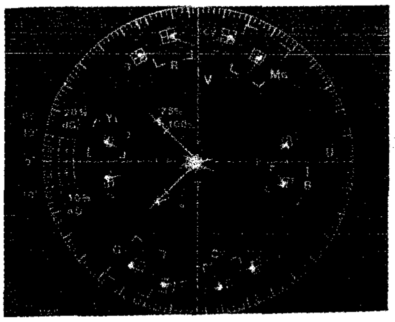
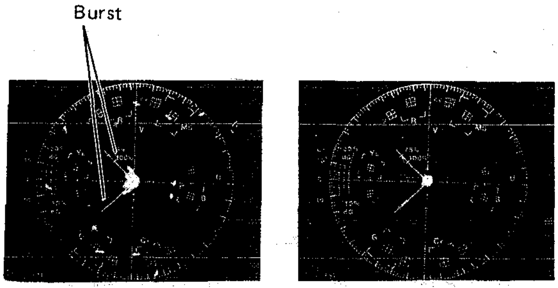


Fig. 5-2-21

- Set the Color Bar/Camera Selection Switch on the RCU adaptor to the CAMERA position.
- Adjust CT1 (BURST REFERENCE PHASE) on the VIC1 of the Process board so that the burst vectors position on the noted position on the vectorscope. (Fig. 5-2-22)



NO GOOD **GOOD**

Fig. 5-2-22

(23) Chroma adjustment

Test point : **Video output**
Adjust : **VR5 (Chroma crip)** **Process board**
VR6 (R chroma level) **Process board**
VR7 (B-Y phase) **Process Sub board**
VR8 (R-Y Gain) **Process Sub board**

- Connect the Video output connector to the vector scope.
- Connect TP3 (AUTO RESET) of Microprocessor Board to Ground.
- Aim the camera at the colour chip chart.
- Turn VR5 (chroma crip) fully counterclockwise to release the chroma cripping.

- Adjust VR6 (R Chroma Gain) so that the red chroma level of red vector become 175 ± 2% as compares to the burst vector. (Fig. 5-2-23)

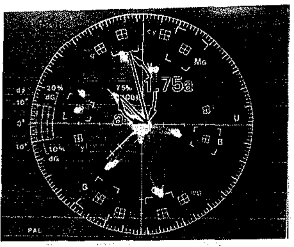


Fig. 5-2-23

- Adjust VR8 (R-Y Gain) so that the yellow chroma level of yellow vector become 146 ± 5% as compares to the burst vector. (Fig. 5-2-24)

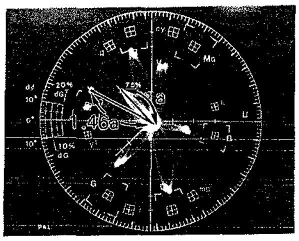


Fig. 5-2-24

- Adjust VR7 (B-Y phase) so that the red chroma phase of red vector become 106 ± 1° as compares to the burst vector. (Fig. 5-2-25)

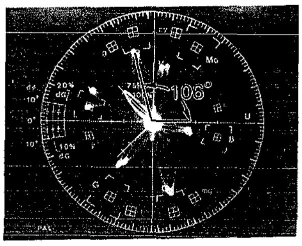


Fig. 5-2-25

- Connect the Video output connector to the oscilloscope.
- Set the oscilloscope to H. rate.
- Aim the camera at the logarithmic gray scale chart.
- Set the AGC switch of the camera to High (Upper) position.
- Set the lens iris to fully open by the lens iris VR.
- Adjust VR5 (Chroma crip) so that the carrier leak level of over 0.7V becomes minimum. (Fig. 5-2-26)

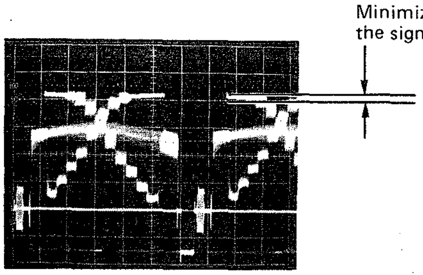


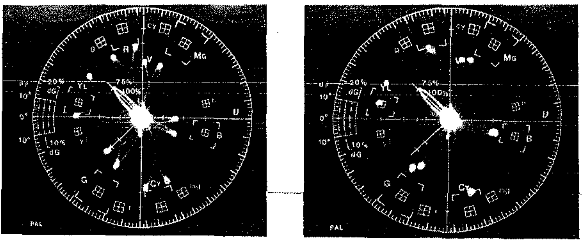
Fig. 5-2-26

- Cap on the lens over two seconds, and suddenly cap off the lens. If the signal of over 0.7V has carrier leak when the time just after cap off the lens, adjust VR5 again.

(24) Total chroma phase

Test point : Video Output
Adjust : VR8 (Total chroma phase) Process board

- Connect the Video output connector to the vectorscope.
- Connect TP3 (AUTO PRESET) of Microprocessor Board to Ground.
- Aim the camera at the colour chip chart.
- Adjust VR8 (Total chroma phase) so that the distance of the each vectors is become minimum. (Fig. 5-2-27)



NO GOOD **GOOD**

Fig. 5-2-27

(25) White balance adjustment

Test point : Video output
Adjust : VR2 (B Preset) Microprocessor board
VR3 (R Preset) Microprocessor board

- Connect the Video output connector to the vectorscope.
- Set the AGC switch of the camera to Low (Middle) position.
- Connect TP3 (AUTO PRESET) of Microprocessor Board to Ground.
- Aim the camera at the white chart.
- Adjust VR2 (B Preset) and VR3 (R Preset) so that the vector on the vectorscope position at center of vectorscope. (Fig. 5-2-28)

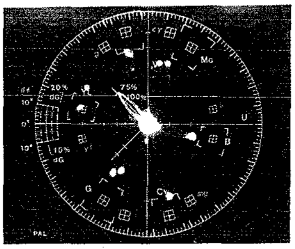


Fig. 5-2-28

(26) ATW R, B adjustmen

Test point : **Video out**
Adjust : **VR1 (ATW B preset)** **Process board**
VR2 (ATW R preset) **Process board**
VR3 (ATW R Gain) **Process board**
VR4 (ATW BGain) **Process board**

- Connect the Video output connector to the vectorscope.
- Connect TP2 of Microprocessor board to TP4 of Microprocessor board.

  Note : If connected TP3 and Ground, which connection is going to open.
- Set the ATW/AWC switch to ATW position.
- Aim the camera at the white chart.
- Slowly adjust VR1 (ATW B preset) and VR2 (ATW R preset) so that the vector on the vector scope positions at the center of vectorscope. (Fig. 5-2-28)
- Set the colour temperature conversion filter which converts 3,200°k in fromt of the lens and faceplate of ATW sensor.

  Note : If there is no colour conversion filter, the ATW sensor gain can roughly be adjusted by using the outdoor light.
- Adjust VR3 (ATW R gain) and VR4 (ATW B gain) so that the vector on the vectorscope positions at the center of vectorscope. (Fig. 5-2-28)
- Disconnect TP2 of Microprocessor board to TP4 of Microprocessor board.

(27) Character size adjustment

Test point : **Video out**
Adjust : **VR1 (CHARACTER SIZE)** **Microprocessor board**

- Mount the grip/shoulder pad (WV-GR15) on the camera by sliding back the grip/shoulder pad after engaging the connectors on the camera and grip/shoulder pad.
- Connect the Video output connector to the oscilloscope.
- Press the TITLE button and then SET button to display the dots or the title on the colour video monitor. (Fig. 5-2-29)

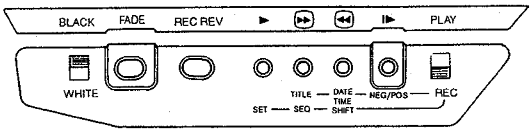


Fig. 5-2-29

- Adjust VR1 (CHARACTER SIZE) so that the right side dot or character signal become 36 μsec from the SYNC signal. (Fig. 5-2-30)

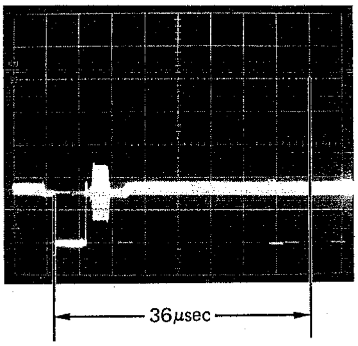


Fig. 5-2-30

(28) Time frequency adjustment

Test point : **TP1 (TIME FREQ.)** **Microprocessor board**
Adjust: **CT1 (TIME FREQ. ADJ)** **Microprocessor board**

- Connect the frequency counter to TP1 (TIME FREQ.)

Note : The frequency counter should read the frequency of 0.01Hz.

- Adjust CT1 (TIME FREQ. ADJ) so that the frequency at TP1 is as shown in the Table.

Room Temperature	Time Frequency (Hz)
From 5°C to less than 8°C0	32767.607 ± 0.03
From 8°C to less than11°C	32767.688 ± 0.03
From 11°C to less than 14°C	32767.803 ± 0.03
From 14°C to less than 17°C	32767.885 ± 0.03
From 17°C to less than 31°C	32767.967 ± 0.03
From 31°C to less than 34°C	32767.885 ± 0.03
From 34°C to less than 36°C	32767.803 ± 0.03

(29) Low light detect level adustment

Test point : Video out
Observe : 1' Electronic view finder (WV-VF02)
Adjust : VR4 (Low light level) Drive board

- Connect the 1″ electoronic view finder to the camera unit.
- Connect the Video output connector to the oscilloscope.
- Set the AGC switch to HIGH (U pper) position.
- Aim the camera at the logarithmic gray scale chart.
- Set the lens iris so that the level of video output becomes 35mV.
- Adjust VR4 (Low light level) so that the 1″ EVF as shown just appere the warning indication display.

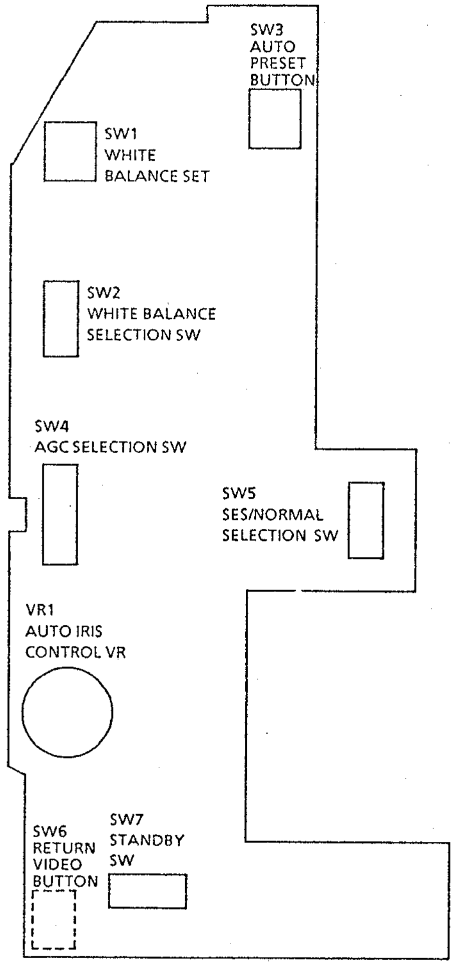
(26) Zebla level indicator adjustment

Test point : Video out
Observe : 1' Electronic view finder (WV-VF02)
Adjust : VR2 (Zebla level) SYNC board.

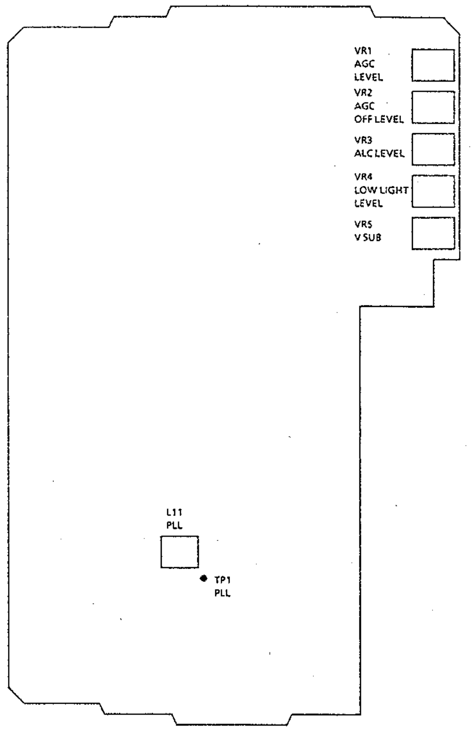
- Connect the 1″ electronic view finder to the camera unit.
- Connect the Video output connector to the oscilloscope.
- Aim the camera at the logarithmic gray scale chart.
- Set the lens iris so that the level of video output becomes 700mV.
- Adjust VR2 (Zebla level) so that the white chip (top step) of the gray scale turns into ZEBRA pattern on the 1″ EVF.

LOCATION OF TEST POINTS AND ADJUSTING CONTROLS —Com

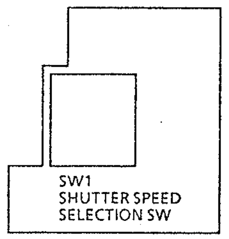
CONTROL BOARD


SW3
AUTO
PRESET
BUTTON
SW1
WHITE
BALANCE SET
SW2
WHITE BALANCE
SELECTION SW
SW4
AGC SELECTION SW
SW5
SES/NORMAL
SELECTION SW
VR1
AUTO IRIS
CONTROL VR
SW6
RETURN
VIDEO
BUTTON
SW7
STANDBY
SW

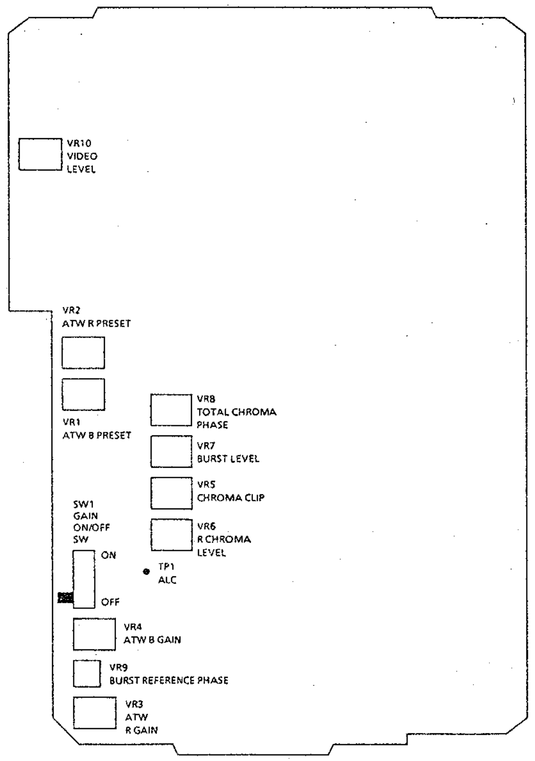
DRIVE BOARD


VR1
AGC
LEVEL
VR2
AGC
OFF LEVEL
VR3
ALC LEVEL
VR4
LOW LIGHT
LEVEL
VR5
V SUB
L11
PLL
TP1
PLL

SHUTTER BOARD

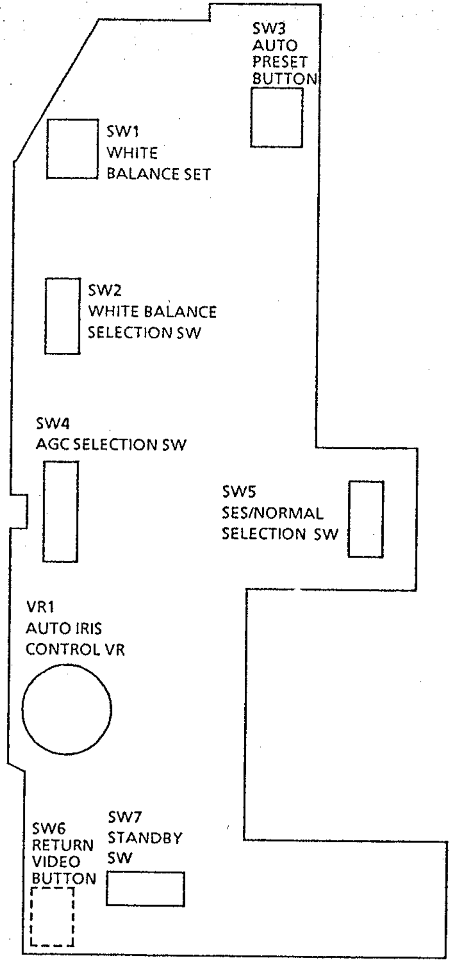

SW1
SHUTTER SPEED
SELECTION SW

PROCESS BOARD

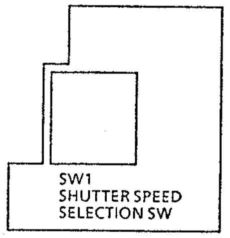

VR10
VIDEO
LEVEL
VR2
ATW R PRESET
VR1
ATW B PRESET
VR8
TOTAL CHROMA
PHASE
VR7
BURST LEVEL
VR5
CHROMA CLIP
VR6
R CHROMA
LEVEL
SW1
GAIN
ON/OFF
SW
ON
OFF
TP1
ALC
VR4
ATW B GAIN
VR9
BURST REFERENCE PHASE
VR3
ATW
R GAIN

LOCATION OF TEST POINTS AND ADJUSTING CONTROLS —Component Side—

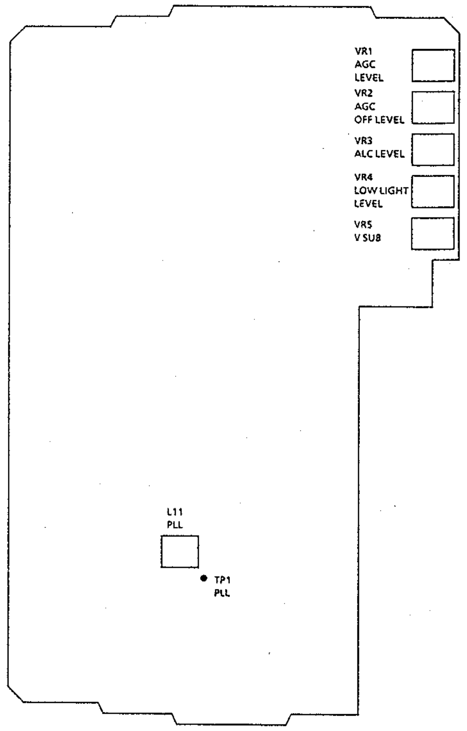
CONTROL BOARD


SW3
AUTO
PRESET
BUTTON
SW1
WHITE
BALANCE SET
SW2
WHITE BALANCE
SELECTION SW
SW4
AGC SELECTION SW
SW5
SES/NORMAL
SELECTION SW
VR1
AUTO IRIS
CONTROL VR
SW6
RETURN
VIDEO
BUTTON
SW7
STANDBY
SW

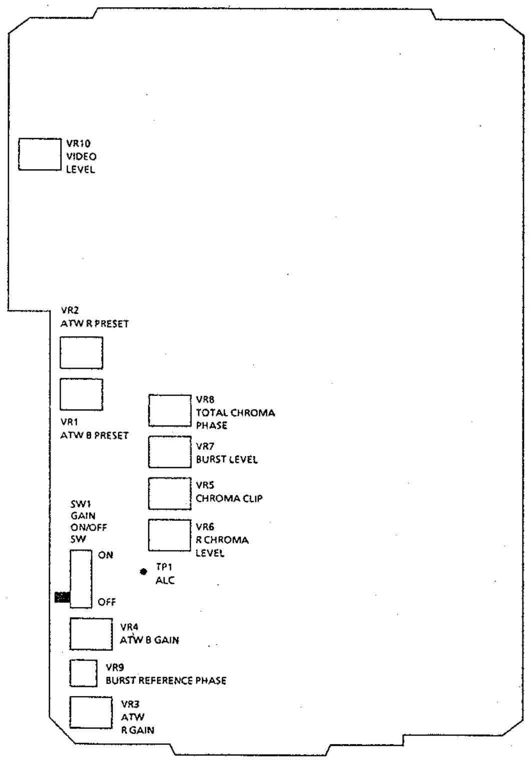
SHUTTER BOARD


SW1
SHUTTER SPEED
SELECTION SW

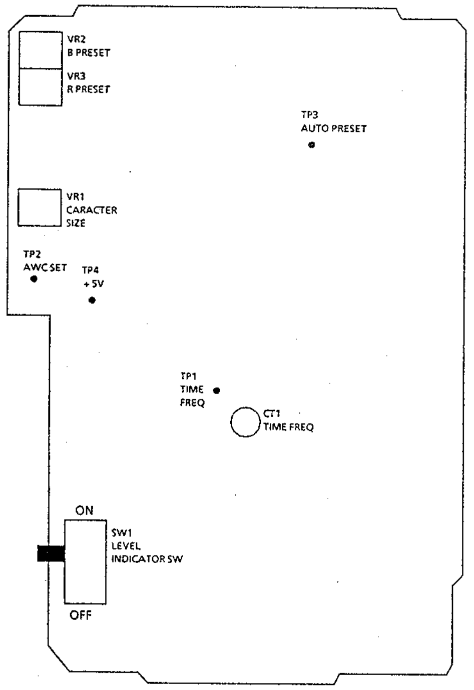
DRIVE BOARD


VR1
AGC
LEVEL
VR2
AGC
OFF LEVEL
VR3
ALC LEVEL
VR4
LOW LIGHT
LEVEL
VR5
V SUB
L11
PLL
TP1
PLL

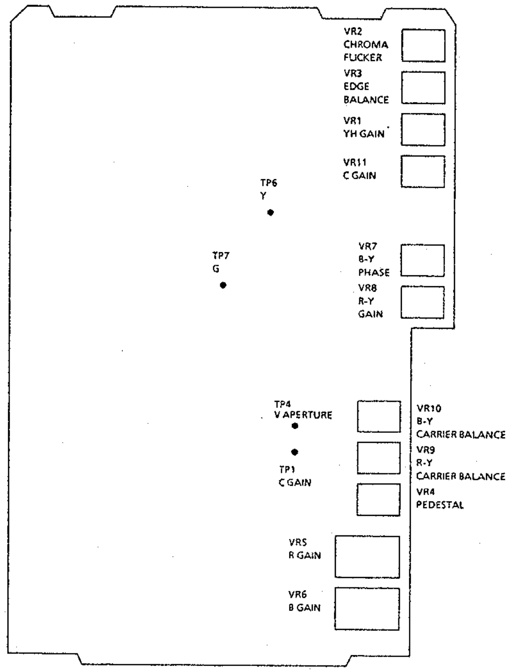
PROCESS BOARD


VR10
VIDEO
LEVEL
VR2
ATW R PRESET
VR1
ATW B PRESET
VR8
TOTAL CHROMA
PHASE
VR7
BURST LEVEL
VR5
CHROMA CLIP
VR6
R CHROMA
LEVEL
SW1
GAIN
ON/OFF
SW
ON
OFF
TP1
ALC
VR4
ATW B GAIN
VR9
BURST REFERENCE PHASE
VR3
ATW
R GAIN

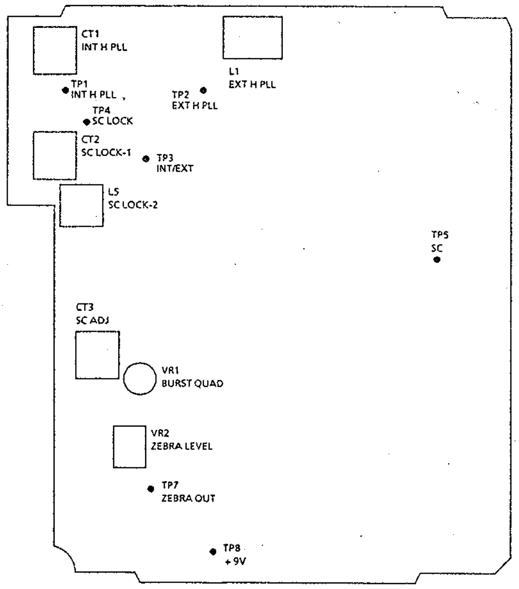
MICROPROCESSOR BOARD


VR2
B PRESET
VR3
R PRESET
TP3
AUTO PRESET
VR1
CARACTER
SIZE
TP2
AWC SET
TP4
+ 5V
TP1
TIME
FREQ
CT1
TIME FREQ
ON
SW1
LEVEL
INDICATOR SW
OFF

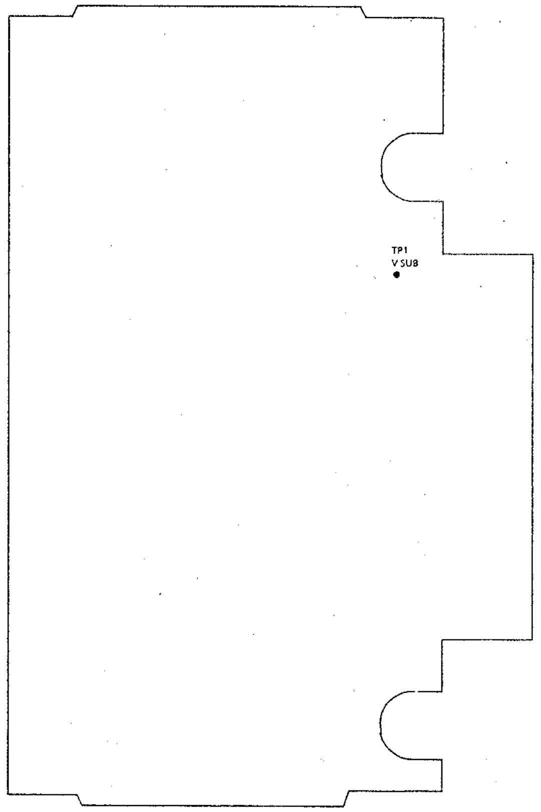
PROCESS SUB BOARD


VR2
CHROMA
FLICKER
VR3
EDGE
BALANCE
VR1
YH GAIN
VR11
C GAIN
TP6
Y
TP7
G
VR7
B-Y
PHASE
VR8
R-Y
GAIN
TP4
V APERTURE
TP1
C GAIN
VR10
B-Y
CARRIER BALANCE
VR9
R-Y
CARRIER BALANCE
VR4
PEDESTAL
VR5
R GAIN
VR6
B GAIN

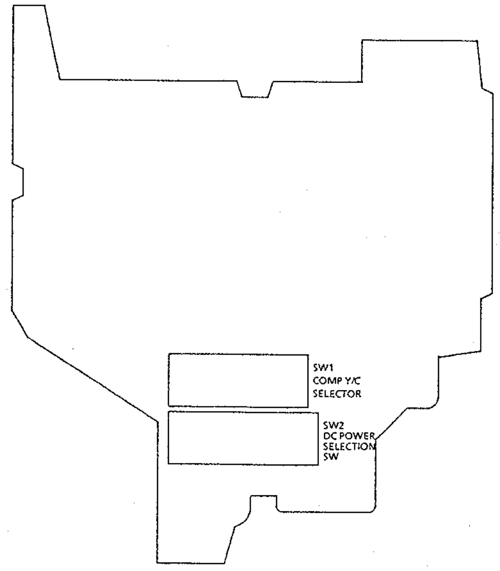
SYNC BOARD


CT1
INT H PLL
L1
EXT H PLL
TP1
INT H PLL
TP2
EXT H PLL
TP4
SC LOCK
CT2
SC LOCK-1
TP3
INT/EXT
L5
SC LOCK-2
TP5
SC
CT3
SC ADJ
VR1
BURST QUAD
VR2
ZEBRA LEVEL
TP7
ZEBRA OUT
TP8
+ 9V

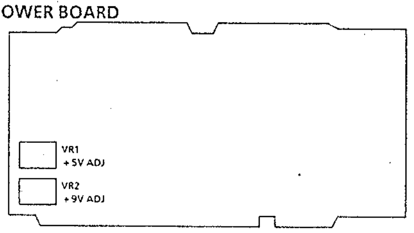
SENSOR BOARD



AUDIO BOARD


SW1
COMP Y/C
SELECTOR
SW2
DC POWER
SELECTION
SW

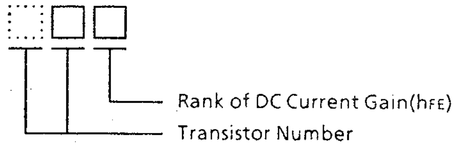
POWER BOARD


VR1
+5V ADJ
VR2
+9V ADJ

CHIP COMPONENTS

1. Chip Transistor

The transistor number is indicated on the top surface of the chip transistor using two alphabet letters or one numerical and two alphabet letters.


Rank of DC Current Gain(hFE)
Transistor Number

Transistor Number

(Chip Transistor)

Letter	Transister No.	Letter	Transister No.
A	2SB709	X	2SD602A
B	2SB709A	Y	2SD601
C	2SB710	Z	2SD601A
D	2SB710A	1A	2SB799
E	2SA1022	1B	2SB814
F	2SA1034	1C	2SB902
H	2SA1035	1F	2SK321
I	2SB792	1K	2SK316
K	2SC2778	1L	2SK247
P	2SD814	1M	2SJ84
Q	2SD813	1N	2SK199
R	2SC2480	1O	2SK198
S	2SC2405	1T	2SC3077
T	2SC2406	1X	2SC2845
U	2SC2404	1Z	2SD1030
V	2SC2295	2B	2SK374
W	2SD602	2C	2SK116

(Small Chip Transistor)

Letter	Transister No.
A	2SB1218
U	2SC3931
W	2SD1820
Y	2SD1819
E3	2SA1226
OS	2SB1219
UC	2SA1532
YU	2SC3938

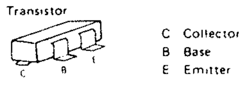
(Pair Transistor)

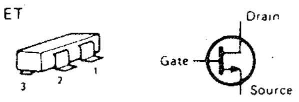
Letter	Transister No.
5C	XN4601
5N	XN6501
5O	XN6401

Example :

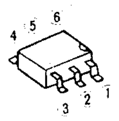
WQ ⟶ 2SD602 - Q
YQ ⟶ 2SD601 - Q
1BS ⟶ 2SB814 - S

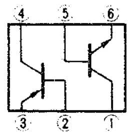
Appearance and Symbols

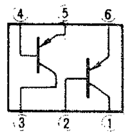

Transistor
C
B
E
C Collector
B Base
E Emitter

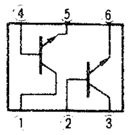

FET
3
2
1
Drain
Gate
Source

	1	2	3
Except 2SK199	Drain	Source	Gate
2SK199	Gate	Drain	Source



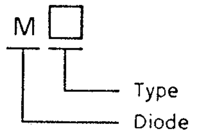






2. Chip Diode

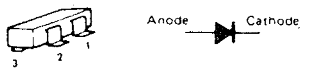
The diode number is indicated on the top surface of the chip diode using Two alphabet letters.


M
Type
Diode

Diode Number

Letter	Diode No.	Letter	Diode No.
MA	MA151A	MI	MA152K
MB	MA152A	MK	MA28W-B
MC	MA153	ML	MA28T-A
MD	MA28-A	MN	MA151WA
ME	MA28-B	MO	MA152WA
MF	MA28W-A	MT	MA151WK
MH	MA151K	MU	MA152WK

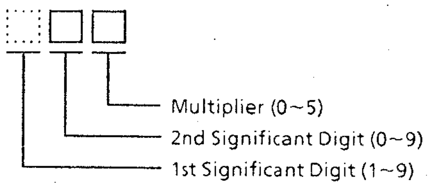
Appearance and Symbols


3
2
1
Anode
Cathode

	1	2	3
MA28/MA28W/MA28T	-	Anode	Cathode
MA151K/MA152K	-	Anode	Cathode
MA151A/MA152A	-	Cathode	Anode
MA151WK/MA152WK	Anode	Anode	Cathode
MA151WA/MA152WA	Cathode	Cathode	Anode
MA153	Cathode	Anode	Common

3. Chip Resistor

The resistor value is indicated on the bottom surface of the chip resistor using three digit numbers.


Multiplier (0~5)
2nd Significant Digit (0~9)
1st Significant Digit (1~9)

Example :

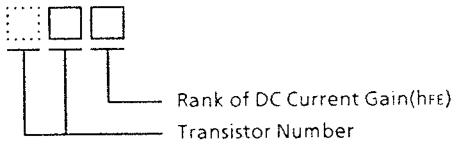
330 ⟶ $33 \times 10^0 = 33$ ohms
561 ⟶ $56 \times 10^1 = 560$ ohms
123 ⟶ $12 \times 10^3 = 12$ ohms

Note : Zero ohm resistor (jumper chip) is colored red or green.

CHIP COMPONENTS

1. Chip Transistor

The transistor number is indicated on the top surface of the chip transistor using two alphabet letters or one numerical and two alphabet letters.


Rank of DC Current Gain(h_{FE})
Transistor Number

Transistor Number

(Chip Transistor)

Letter	Transister No.	Letter	Transister No.
A	2SB709	X	2SD602A
B	2SB709A	Y	2SD601
C	2SB710	Z	2SD601A
D	2SB710A	1A	2SB799
E	2SA1022	1B	2SB814
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K	2SC2778	1L	2SK247
P	2SD814	1M	2SJ84
Q	2SD813	1N	2SK199
R	2SC2480	1O	2SK198
S	2SC2405	1T	2SC3077
T	2SC2406	1X	2SC2845
U	2SC2404	1Z	2SD1030
V	2SC2295	2B	2SK374
W	2SD602	2C	2SK116

(Small Chip Transistor)

Letter	Transister No.
A	2SB1218
U	2SC3931
W	2SD1820
Y	2SD1819
E3	2SA1226
OS	2SB1219
UC	2SA1532
YU	2SC3938

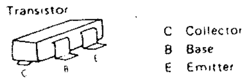
(Pair Transistor)

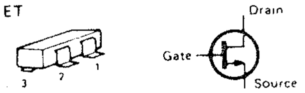
Letter	Transister No.
5C	XN4601
5N	XN6501
5O	XN6401

Example :

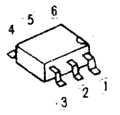
WQ ⟶ 2SD602 - Q
YQ ⟶ 2SD601 - Q
1BS ⟶ 2SB814 - S

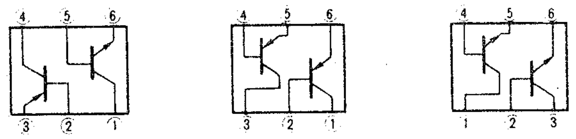
Appearance and Symbols


Transistor
C
B
E
C Collector
B Base
E Emitter


FET
3
2
1
Drain
Gate
Source

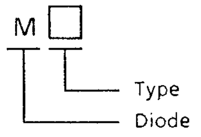
	1	2	3
Except 2SK199	Drain	Source	Gate
2SK199	Gate	Drain	Source




4
5
6
3
2
1
4
5
6
3
2
1
4
5
6
1
2
3

2. Chip Diode

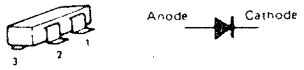
The diode number is indicated on the top surface of the chip diode using Two alphabet letters.


M
Type
Diode

Diode Number

Letter	Diode No.	Letter	Diode No.
MA	MA151A	MI	MA152K
MB	MA152A	MK	MA28W-B
MC	MA153	ML	MA28T-A
MD	MA28-A	MN	MA151WA
ME	MA28-B	MO	MA152WA
MF	MA28W-A	MT	MA151WK
MH	MA151K	MU	MA152WK

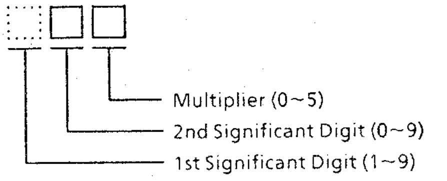
Appearance and Symbols


3
2
1
Anode
Cathode

	1	2	3
MA28/MA28W/MA28T	-	Anode	Cathode
MA151K/MA152K	-	Anode	Cathode
MA151A/MA152A	-	Cathode	Anode
MA151WK/MA152WK	Anode	Anode	Cathode
MA151WA/MA152WA	Cathode	Cathode	Anode
MA153	Cathode	Anode	Common

3. Chip Resistor

The resistor value is indicated on the bottom surface of the chip resistor using three digit numbers.


Multiplier (0~5)
2nd Significant Digit (0~9)
1st Significant Digit (1~9)

Example :

330 ⟶ $33 \times 10^0 = 33$ ohms
561 ⟶ $56 \times 10^1 = 560$ ohms
123 ⟶ $12 \times 10^3 = 12$ ohms

Note : Zero ohm resistor (jumper chip) is colored red or green.

4. Chip Capacitor

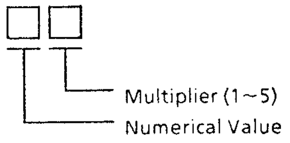
The capacitive value of replacement chip capacitors is indicated on the bottom surface. Original parts do not have value indication.

If the capacitive value is less than 100 pF, the value will be indicated by one or two digit number expressing the capacity directly in pF.

Example :

0.5 ⟶ 0.5 pF　　2.5 ⟶ 2.5 pF
75 ⟶ 0.75 pF　　33 ⟶ 33 pF
1 ⟶ 1 pF　　82 ⟶ 82 pF

If the capacitive value is 100 pF or greater, the value will be indicated by an alpha-numeric code. The letter precedes the number and expresses a numerical value to be multiplied by the number which follows.


Multiplier (1~5)
Numerical Value

Numerical Value

Letter	Value	Letter	Value
A	10	N	33
B	11	P	36
C	12	Q	39
D	13	R	43
E	15	S	47
F	16	T	51
G	18	U	56
H	20	V	62
J	22	W	68
K	24	X	75
L	27	Y	82
M	30	Z	91

*Letters I and O are not used

Example :

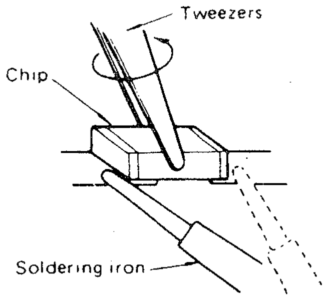
A1 ⟶ $10 \times 10^1 = 100$ pF
N2 ⟶ $33 \times 10^2 = 3300$ pF
S3 ⟶ $47 \times 10^3 = 47000$ pF

5. Precautions in replacing the chip component

1. Make sure that the unit is turned OFF when replacing the chip.
2. Use tweezers to prevent any damage to the chip surface.
3. Do not re-use the chips after removal.
4. Do not rub the electrode of chips.
5. Do not subject the chips to excessive stress.
6. It is recommended that a pencil-type soldering iron to be used.
7. The solder whose diameter is less than 0.5 mm is recommended.
8. Do not heat the chip beyond 3 seconds.
9. Maintain temperature control under 260°C (500°F) when soldering.

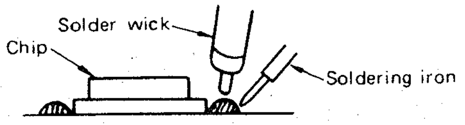
5-1 Removal (Transistor, Diode, Resistor and Capacitor)

1. Add the solder to both ends of the chip (three leads for chip transistor).
2. While attaching the soldering iron to both ends of the chip (three leads for chip transistor) as shown below, remove the chip by turning it with tweezers.
   Note : Be careful not to damage other chips.

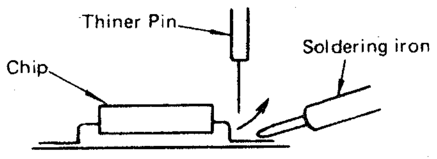

Tweezers
Chip
Soldering iron

5-2 Removal (IC)

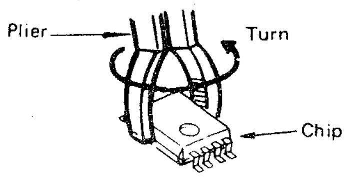
1. Add the solder wick and solder iron to each lead of the IC and remove solder.


Solder wick
Chip
Soldering iron

2. Add the solder iron to each lead of the IC and left each lead of the IC using thiner pin.

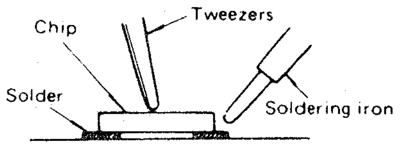

Thiner Pin
Soldering iron
Chip

3. Remove IC turning it with plier.

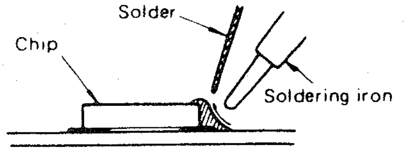

Plier
Turn
Chip

5-3 Mounting

1. Place the solder thinly on the chip mounting foil.
2. Solder the chip temporarily while holding the chip with the tweezers.


Chip
Tweezers
Solder
Soldering iron

3. Solder both ends of chip (three leads for chip transistor).


Solder
Chip
Soldering iron

Service Manual

System Camera

WV-F15E

Vol. 3

Block Diagrams
Schematic Diagrams
Conductor Views

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- MOTHER BOARD 3-16
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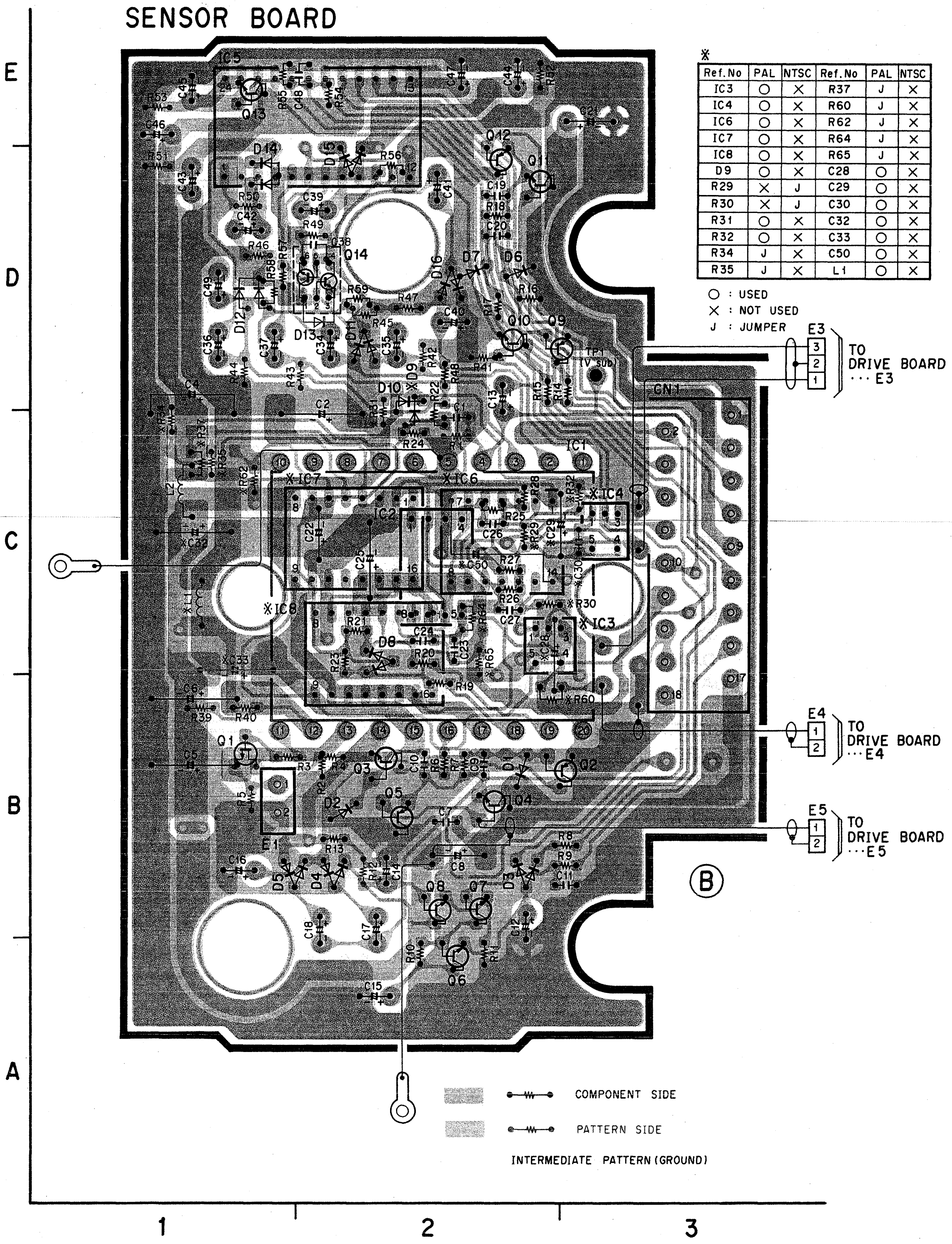
APEARANCE OF IC, TRANSISTOR AND DIODE 3-26

CONDUCTOR VIEW OF SENSOR BOARD

Sensor Board

<Index>

IC1	B2
IC2	C2
IC3	C2
IC4	C3
IC5	E2
IC6	C2
IC7	C2
IC8	C2
Q1	B1
Q2	B3
Q3	B2
Q4	B2
Q5	B2
Q6	A2
Q7	B2
Q8	B2
Q9	D2
Q10	D2
Q11	D2
Q12	D2
Q13	E1
Q14	D2
D1	B2
D2	B2
D3	B2
D4	B2
D5	B1
D6	D2
D7	D2
D8	C2
D9	C2
D10	D2
D11	D2
D12	D1
D13	D2
D14	D1
D15	D2
D16	D2

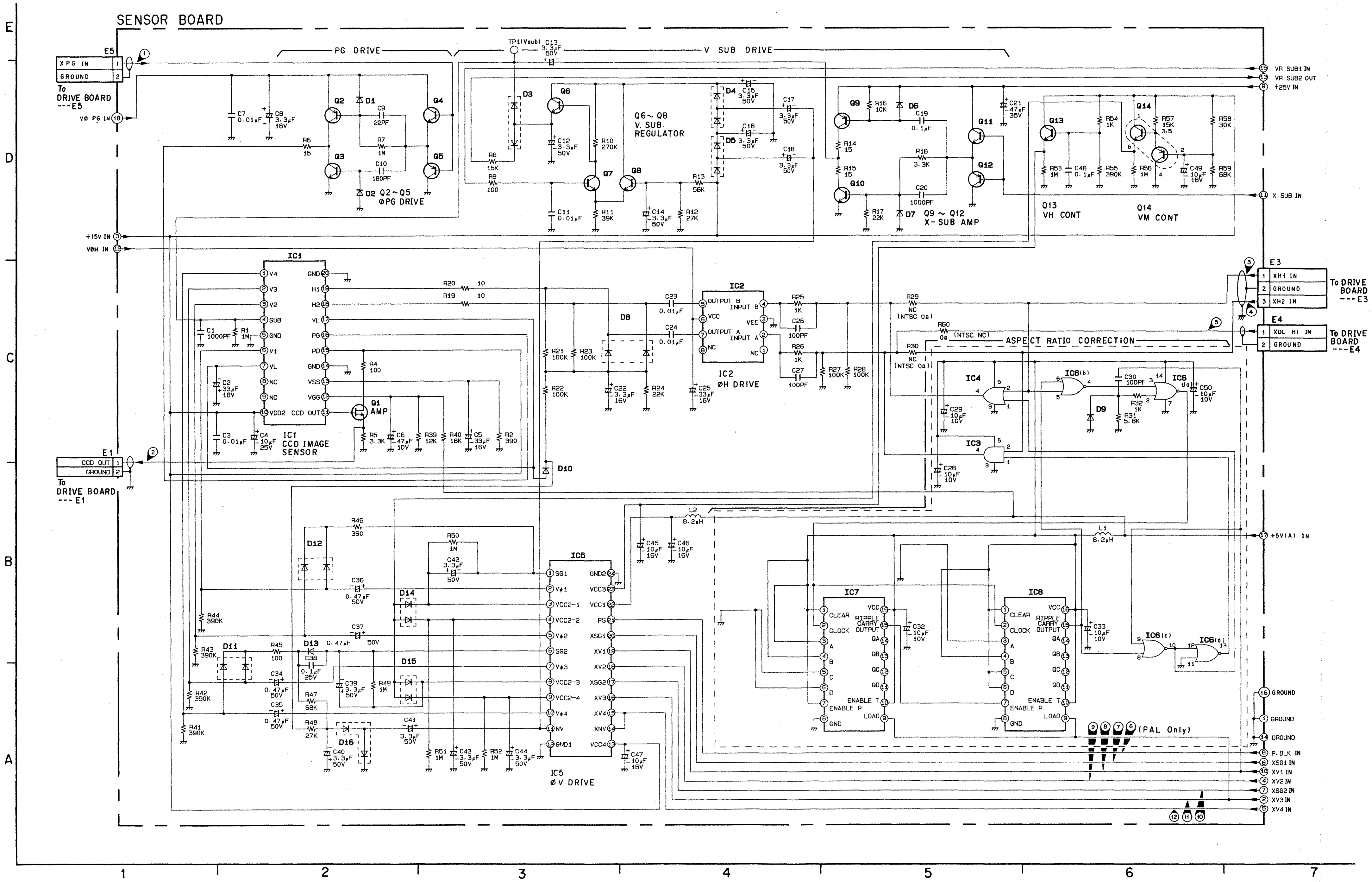

SENSOR BOARD
E
D
C
B
A
1
2
3
E3
TO DRIVE BOARD ···E3
E4
TO DRIVE BOARD ···E4
E5
TO DRIVE BOARD ···E5
CN1
TP1 (V sub)
IC1
IC2
※IC3
※IC4
IC5
※IC6
※IC7
※IC8
E1
(B)
COMPONENT SIDE
PATTERN SIDE
INTERMEDIATE PATTERN (GROUND)

※

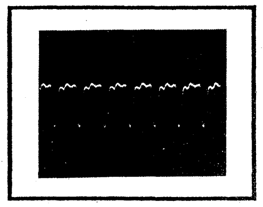
Ref.No	PAL	NTSC	Ref.No	PAL	NTSC
IC3	○	×	R37	J	×
IC4	○	×	R60	J	×
IC6	○	×	R62	J	×
IC7	○	×	R64	J	×
IC8	○	×	R65	J	×
D9	○	×	C28	○	×
R29	×	J	C29	○	×
R30	×	J	C30	○	×
R31	○	×	C32	○	×
R32	○	×	C33	○	×
R34	J	×	C50	○	×
R35	J	×	L1	○	×

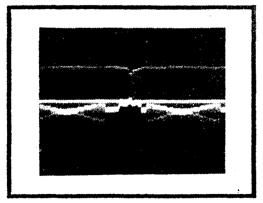
○ : USED
× : NOT USED
J : JUMPER

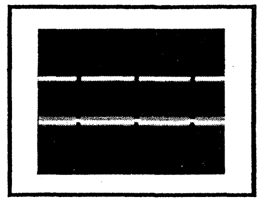
SCHEMATIC DIAGRAM OF SENSOR BOARD

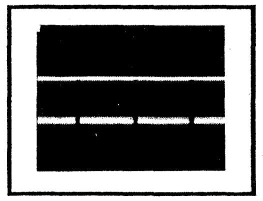

E
D
C
B
A
1
2
3
4
5
6
7
SENSOR BOARD
E5
XPG IN
GROUND
To DRIVE BOARD ---E5
VØ PG IN
PG DRIVE
V SUB DRIVE
TP1(Vsub)
Q2~Q5 ØPG DRIVE
Q6~Q8 V. SUB REGULATOR
Q9 ~ Q12 X-SUB AMP
Q13 VH CONT
Q14 VM CONT
VR SUB1 IN
VR SUB2 OUT
+25V IN
X SUB IN
+15V IN
VØH IN
IC1
IC1 CCD IMAGE SENSOR
Q1 AMP
IC2
IC2 ØH DRIVE
D8
D10
E1
CCD OUT
GROUND
To DRIVE BOARD ---E1
E3
XH1 IN
GROUND
XH2 IN
To DRIVE BOARD ---E3
E4
XDL H1 IN
GROUND
To DRIVE BOARD ---E4
ASPECT RATIO CORRECTION
IC3
IC4
IC6(b)
IC6(a)
IC6(c)
IC6(d)
L1 8.2μH
L2 8.2μH
+5V(A) IN
IC5
IC5 ØV DRIVE
IC7
IC8
D11
D12
D13
D14
D15
D16
(PAL Only)
GROUND
P.BLK IN
XSG1 IN
XV1 IN
XV2 IN
XSG2 IN
XV3 IN
XV4 IN

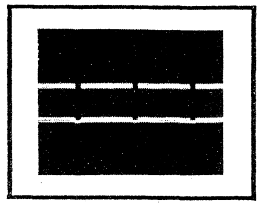
<Waveforms>

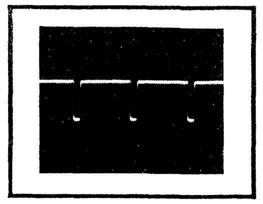

1. 50μsec/DIV, 2V/DIV

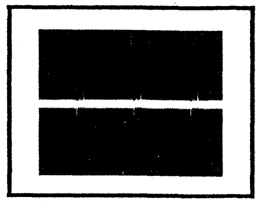

2. 10μsec/DIV, 0.2V/DIV

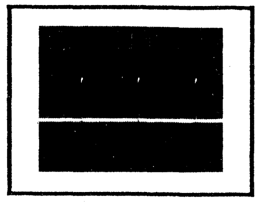

3. 20μsec/DIV, 2V/DIV

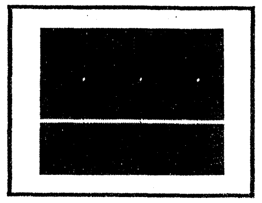

4. 20μsec/DIV, 2V/DIV

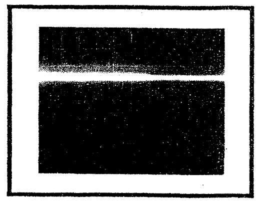

5. 20μsec/DIV, 2V/DIV

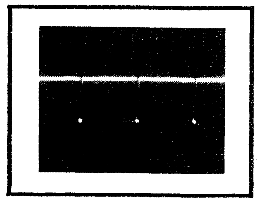

6. 20μsec/DIV, 2V/DIV

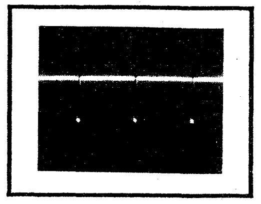

7. 20μsec/DIV, 50mV/DIV


8. 20μsec/DIV, 2V/DIV


9. 20μsec/DIV, 2V/DIV


10. 5m sec/DIV, 2V/DIV


11. 20μsec/DIV, 2V/DIV


12. 20μsec/DIV, 2V/DIV

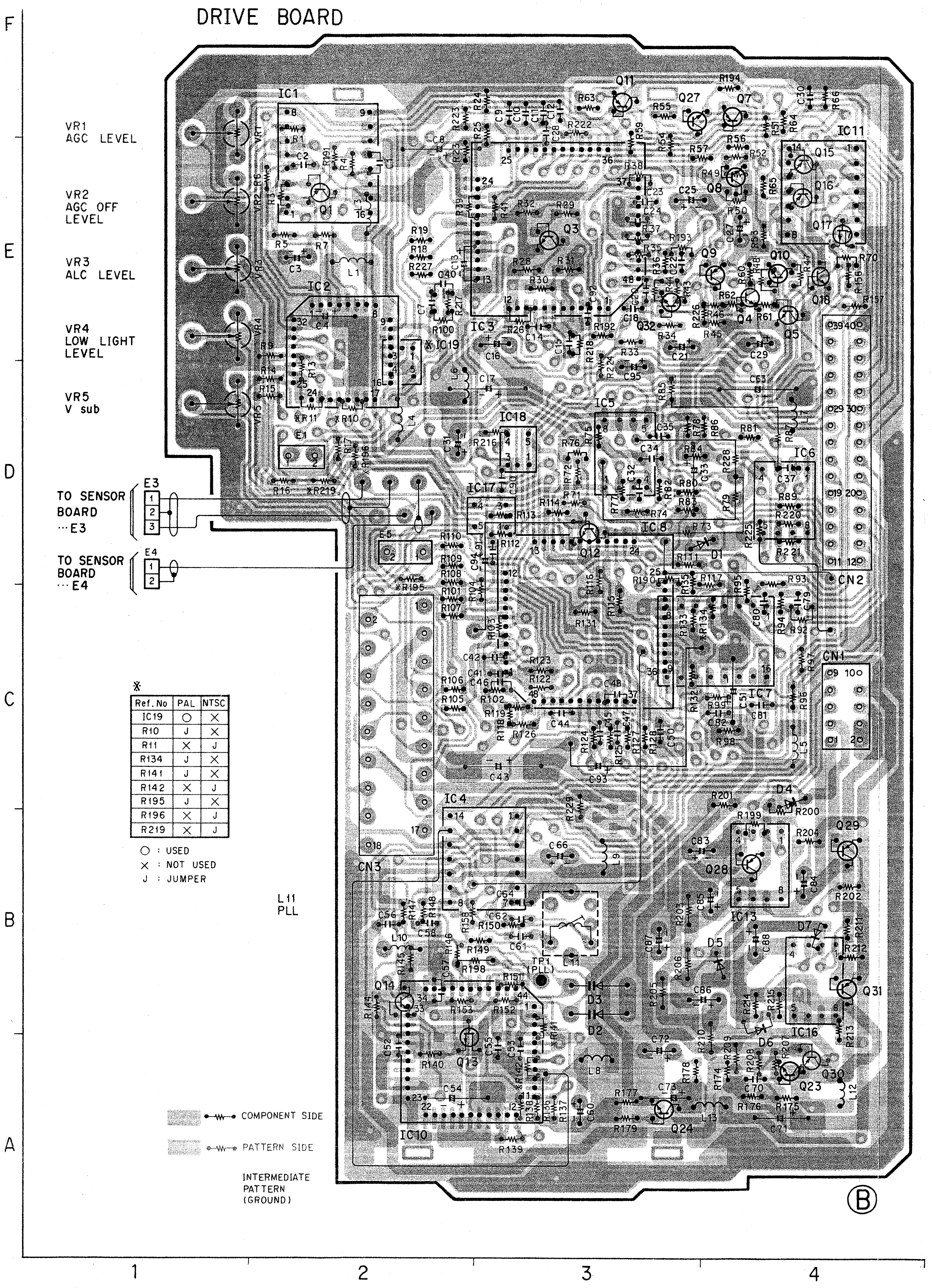
<Index>

IC1	C2	Q12	D5
IC2	C4	Q13	D6
IC3	C5	Q14	D6
IC4	C5	D1	D2
IC5	B3	D2	D2
IC6	C6	D3	D3
IC7	A5	D4	D4
IC8	A6	D5	D4
Q1	C2	D6	D5
Q2	D2	D7	D5
Q3	D2	D8	C4
Q4	D3	D9	C6
Q5	D3	D10	B3
Q6	D3	D11	A2
Q7	D3	D12	B2
Q8	D4	D13	B2
Q9	D5	D14	B2
Q10	D5	D15	A2
Q11	D5	D16	A2

CONDUCTOR VIEW OF DRIVE BOARD

<Index>

IC1	E2
IC2	E2
IC3	E3
IC4	B3
IC5	D3
IC6	D4
IC7	C4
IC8	C3
IC10	A2
IC11	E4
IC13	B4
IC16	B4
IC17	D3
IC18	D3
IC19	E2
Q1	E2
Q3	E3
Q4	E4
Q5	E4
Q7	F4
Q8	E4
Q9	E4
Q10	E4
Q11	F3
Q12	D3
Q13	A2
Q14	B2
Q15	E4
Q16	E4
Q17	E4
Q18	E4
Q23	A4
Q24	A3
Q27	F3
Q28	B4
Q29	B4
Q30	A4
Q31	B4
Q32	E3
D1	D4
D2	B3
D3	B3
D4	C4
D5	B4
D6	B4
D7	B4


DRIVE BOARD
VR1 AGC LEVEL
VR2 AGC OFF LEVEL
VR3 ALC LEVEL
VR4 LOW LIGHT LEVEL
VR5 V sub
TO SENSOR BOARD ···E3
TO SENSOR BOARD ···E4
L11 PLL
COMPONENT SIDE
PATTERN SIDE
INTERMEDIATE PATTERN (GROUND)
Ⓑ
F
E
D
C
B
A
1
2
3
4

※

Ref. No	PAL	NTSC
IC19	○	×
R10	J	×
R11	×	J
R134	J	×
R141	J	×
R142	×	J
R195	J	×
R196	×	J
R219	×	J

○ : USED
× : NOT USED
J : JUMPER

<Voltages>

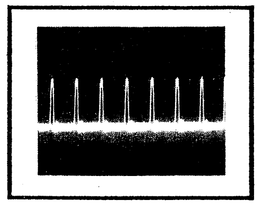
	IC2	IC3	IC8	IC10		IC2	IC3	IC8	IC10
Pin 1	4.9	2.3	-	0	Pin25	4.4	0	0	4.9
2	2.7	2.8	-9.0	0	26	5.0	1.2	5.0	4.9
3	0	0	-9.2	0	27	4.9	2.0	0	4.9
4	0	1.9	4.7	0	28	4.8	1.2	0	4.9
5	4.9	4.9	0.1	3.2	29	0	1.2	0	0
6	4.9	1.9	0	0	30	0	1.9	4.9	4.9
7	0	2.1	4.7	0	31	0	1.2	0	0
8	0	2.6	0.1	4.7	32	2.2	2.0	2.4	0
9	0	3.4	4.9	0.1	33		3.2	2.3	0
10	0	4.9	0	4.1	34		4.9	5.0	4.9
11	0	3.4	8.7	0	35		0	4.2	0
12	0	0.1	0	0	36		1.9	-12.3	0
13	0	3.3	4.7	0	37		0.2	0	0
14	0	3.3	0	0	38		4.2	4.1	0
15	0	0.1	-16.2	4.9	39		0	2.4	0
16	0	0.1	-11.4	4.9	40		0	0.1	0
17	0	0.2	4.9	4.9	41		4.0	0.1	0
18	-	-	4.9	4.9	42		0	4.8	0
19	-	0	4.9	0.7	43		2.9	0.1	0
20	0	-	0.1	0.7	44		1.9	-6.9	0
21	1.7	0	0.1	0.5	45		0	-6.8	
22	0	4.9	0.1	2.3	46		1.9	0	
23	0	2.2	0.1	0	47		1.9	0	
24	0	2.8	0	4.9	48		2.3	-	

	IC1	IC4	IC5	IC6	IC7	IC11	IC13	IC16	IC17	IC18	IC19
Pin 1	0	0	1.8	7.8	0	2.0	4.6	13.6	0.6	0.7	5.0
2	0	4.9	1.8	2.1	0	2.6	2.9	8.9	0	0	0.1
3	2.2	0.6	1.8	2.3	0	2.6	2.9	8.9	0	0	0
4	4.9	4.4	0	0	0	0	0	0	1.3	-3.0	0.1
5	2.7	4.4	1.8	1.8	4.9	0	2.9	0	5.0	4.9	4.9
6	0	0.5	1.8	7.7	0	4.9	2.9	8.9			
7	0	0	1.8	0	0	0	4.5	-			
8	2.6	0	4.9	8.9	0	0	5.4	0			
9	0	0			0	2.4					
10	0	11.2			0	2.4					
11	0	2.2			0	0					
12	0	4.1			0	0					
13	0	0.7			0	1.6					
14	0	4.9			0	4.9					
15	0				4.9						
16	0				4.9						

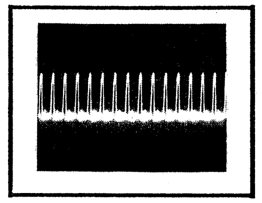
	B	C	E
Q 1	4.9	0.2	4.9
3	5.4	3.8	4.9
4	1.9	2.0	1.8
5	0.5	2.0	1.8
6	8.9	8.9	8.9
7	2.1	0	2.6
8	0	5.0	2.3
9	2.1	0	2.7
10	2.7	4.8	0
11	2.1	0	2.8
12	1.8	1.8	1.8
13	2.6	2.3	4.9
14	3.1	4.9	3.0
15	2.1	0	2.7
16	2.1	0	2.7
17	2.9	0	4.9
18	2.9	4.9	2.2
23	10.5	14.8	9.9
24	6.7	8.8	6.1
27	2.0	4.9	1.4
28	4.7	4.9	0
29	4.7	4.9	5.4
30	-	-	-
31	16.4	14.8	17.0

<Waveforms>

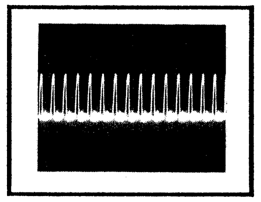
1. 0.1μsec/DIV, 2V/DIV



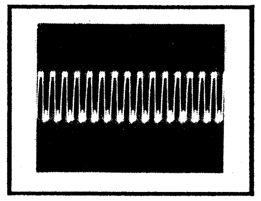
2. 0.1μsec/DIV, 2V/DIV



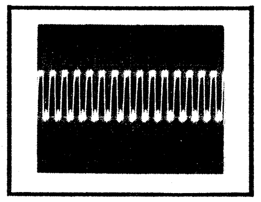
3. 0.1μsec/DIV, 2V/DIV



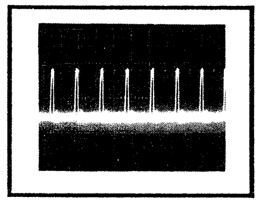
4. 0.1μsec/DIV, 2V/DIV



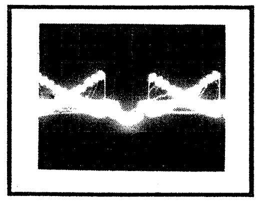
5. 0.1μsec/DIV, 2V/DIV



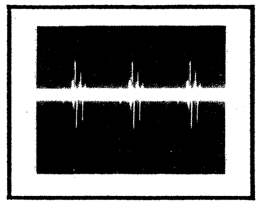
6. 0.1μsec/DIV, 2V/DIV



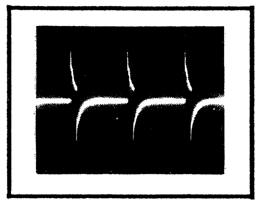
7. 0.1μsec/DIV, 0.1V/DIV



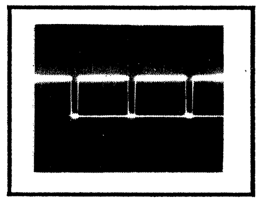
8. 5m sec/DIV, 2V/DIV



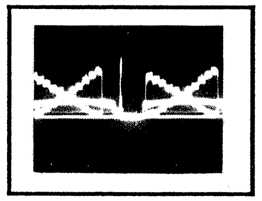
9. 20μsec/DIV, 20mV/DIV



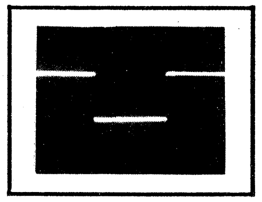
10. 20μsec/DIV, 0.2V/DIV



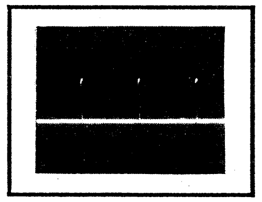
11. 20μsec/DIV, 2V/DIV



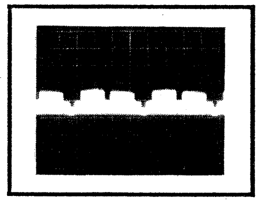
12. 10μsec/DIV, 0.1V/DIV



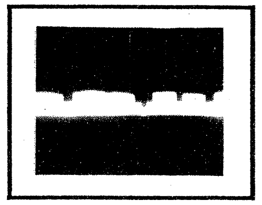
13. 5m sec/DIV, 2V/DIV



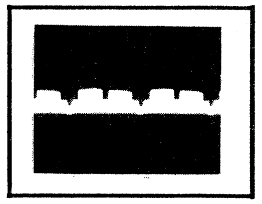
14. 5m sec/DIV, 1V/DIV



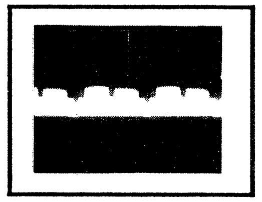
15. 5m sec/DIV, 0.5V/DIV



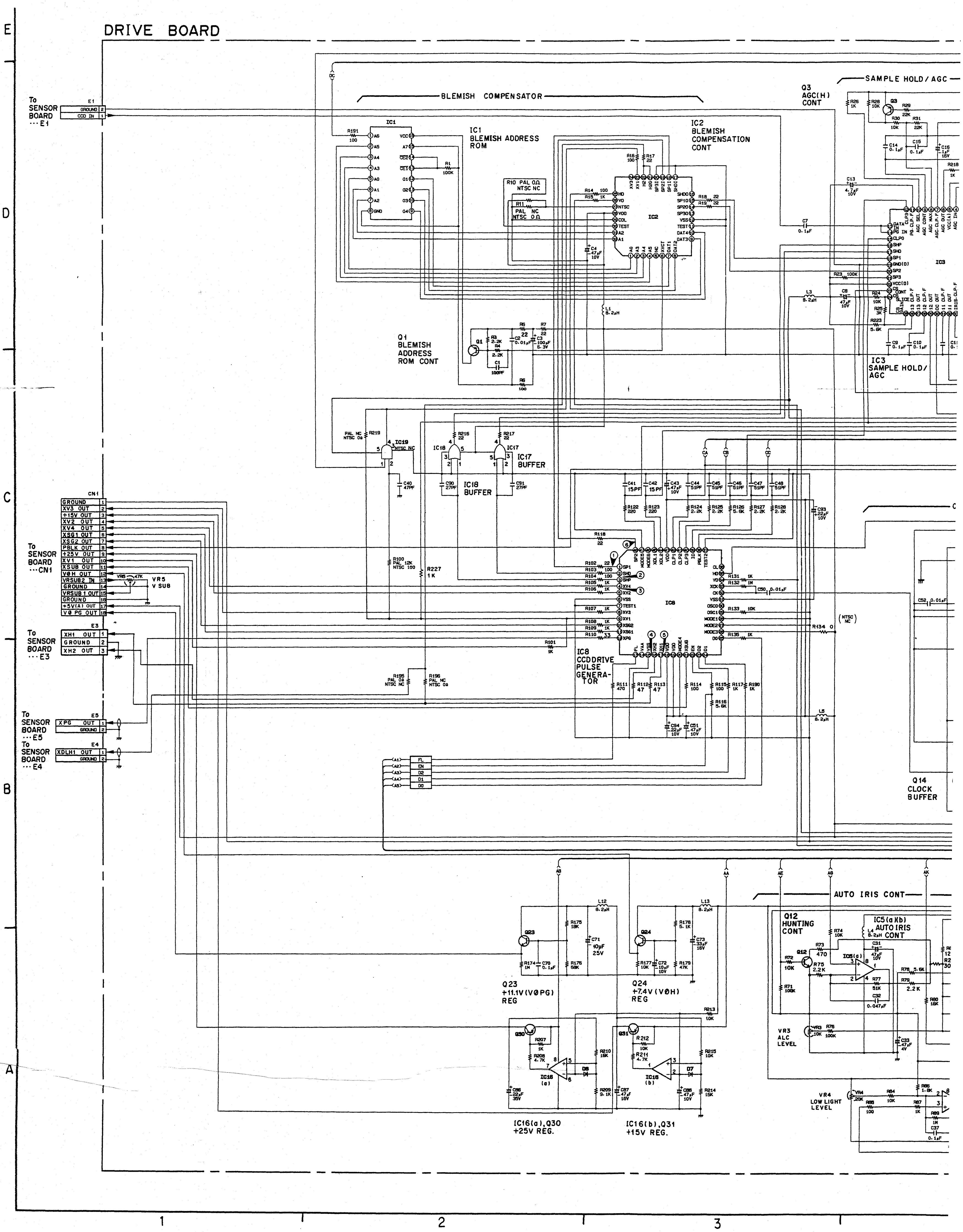
16. 5m sec/DIV, 0.5V/DIV



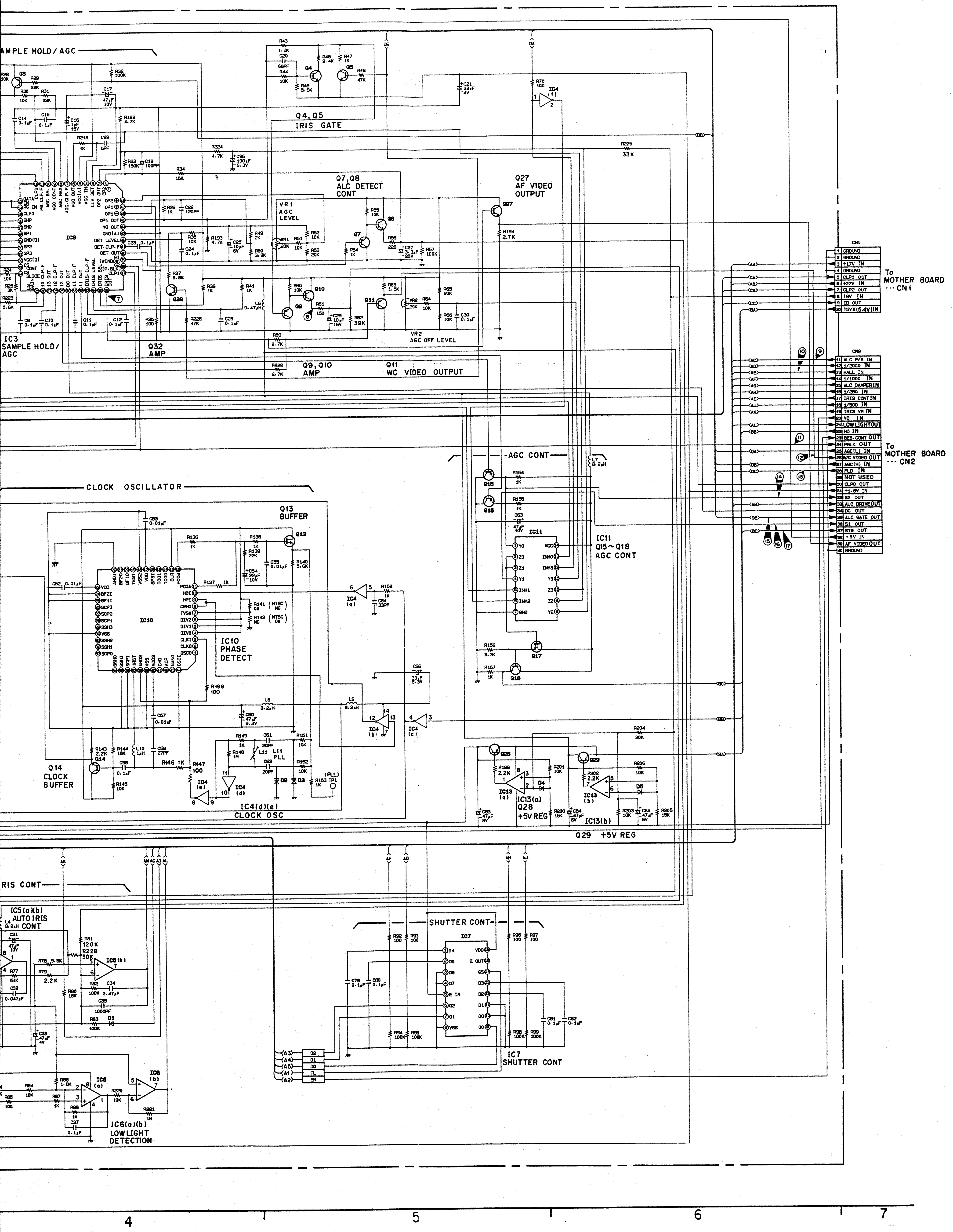
17. 5m sec/DIV, 0.5V/DIV



SCHEMATIC DIAGRAM OF


E
D
C
B
A
1
2
3
DRIVE BOARD
To SENSOR BOARD ···E1
E1
GROUND
CCD IN
BLEMISH COMPENSATOR
IC1
IC1 BLEMISH ADDRESS ROM
IC2 BLEMISH COMPENSATION CONT
R10 PAL 0Ω NTSC NC
R11 PAL NC NTSC 0Ω
Q1 BLEMISH ADDRESS ROM CONT
L1 8.2μH
SAMPLE HOLD / AGC
Q3 AGC(H) CONT
IC3 SAMPLE HOLD/ AGC
IC19
IC18 BUFFER
IC17 BUFFER
CN1
GROUND
XV3 OUT
+15V OUT
XV2 OUT
XV4 OUT
XSG1 OUT
XSG2 OUT
PBLK OUT
+25V OUT
XV1 OUT
XSUB OUT
VØH OUT
VRSUB2 IN
GROUND
VRSUB1 OUT
GROUND
+5V(A) OUT
VØ PG OUT
To SENSOR BOARD ···CN1
VR5 V SUB
E3
XH1 OUT
GROUND
XH2 OUT
To SENSOR BOARD ···E3
E5
XPG OUT
GROUND
To SENSOR BOARD ···E5
E4
XDLH1 OUT
GROUND
To SENSOR BOARD ···E4
IC8
IC8 CCD DRIVE PULSE GENERATOR
R227 1K
R100 PAL 12K NTSC 100
R195 PAL 0Ω NTSC NC
R196 PAL NC NTSC 0Ω
R134 0 (NTSC NC)
L5 8.2μH
L3 8.2μH
Q14 CLOCK BUFFER
AUTO IRIS CONT
Q12 HUNTING CONT
IC5(a)(b) AUTO IRIS CONT
VR3 ALC LEVEL
VR4 LOW LIGHT LEVEL
Q23 +11.1V(VØPG) REG
Q24 +7.4V(VØH) REG
L12 8.2μH
L13 8.2μH
IC16(a),Q30 +25V REG.
IC16(b),Q31 +15V REG.
D8
D7

RAM OF DRIVE BOARD


AMPLE HOLD / AGC
IC3 SAMPLE HOLD/ AGC
Q4, Q5 IRIS GATE
Q7, Q8 ALC DETECT CONT
Q27 AF VIDEO OUTPUT
Q32 AMP
Q9, Q10 AMP
Q11 WC VIDEO OUTPUT
VR1 AGC LEVEL
VR2 AGC OFF LEVEL
To MOTHER BOARD ··· CN1
To MOTHER BOARD ··· CN2
AGC CONT
IC11 Q15~Q18 AGC CONT
CLOCK OSCILLATOR
Q13 BUFFER
IC10 PHASE DETECT
Q14 CLOCK BUFFER
IC4(d)(e) CLOCK OSC
L11 PLL
IC13(a) Q28 +5V REG
IC13(b)
Q29 +5V REG
IRIS CONT
IC5(a)(b) AUTO IRIS CONT
IC6(a)(b) LOWLIGHT DETECTION
SHUTTER CONT
IC7 SHUTTER CONT
4
5
6
7

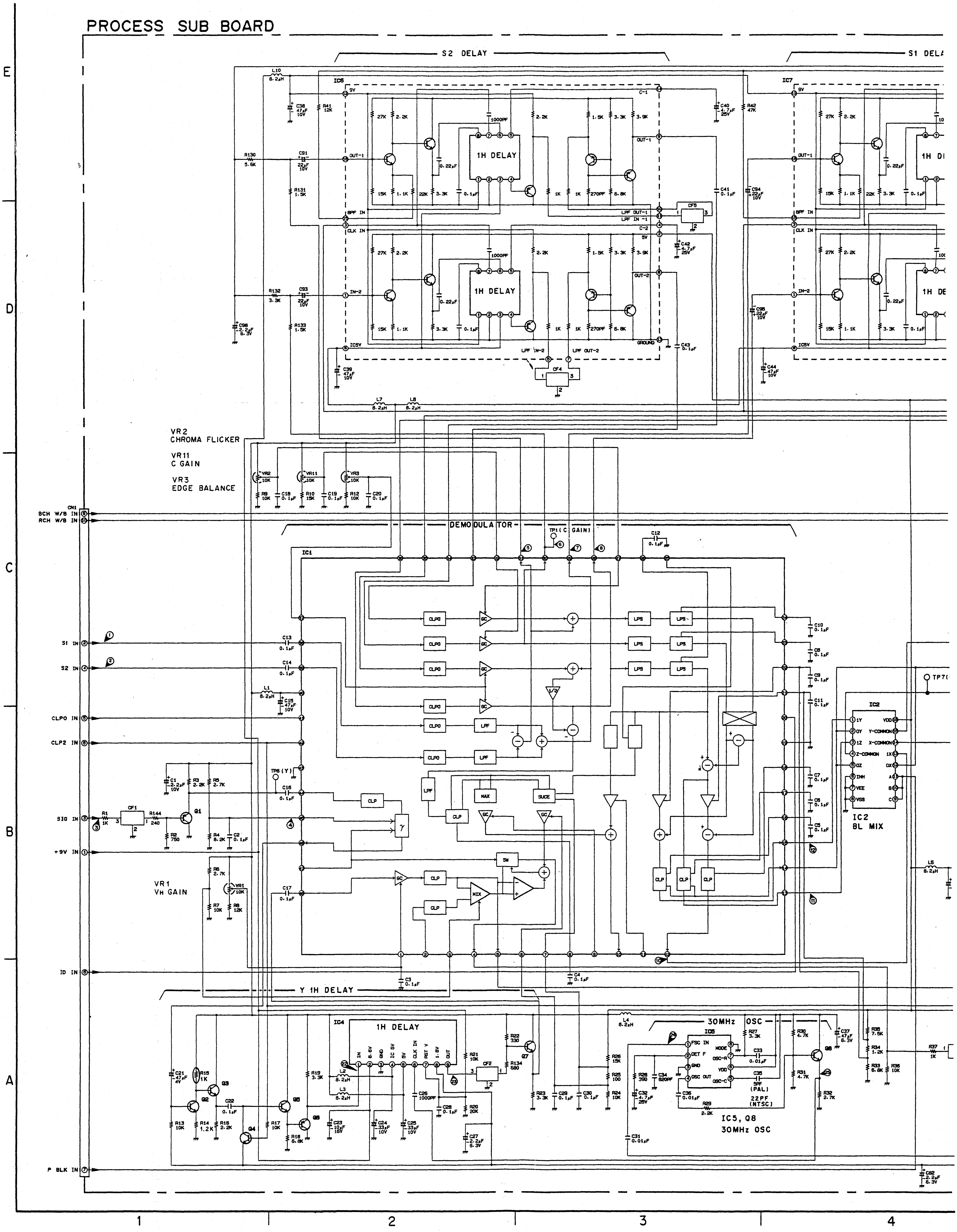
<Index>

IC1	D2
IC2	D3
IC3	D4
IC4	C5
IC5	A4
IC6	A4
IC7	A5
IC8	C3
IC10	C4
IC11	C5
IC13	B5
IC16	A2
IC17	C2
IC18	C2
IC19	C2
Q1	C2
Q3	D4
Q4	D5
Q5	D5
Q7	D5
Q8	D5
Q9	D5
Q10	D5
Q11	D5
Q12	A3
Q13	C5
Q14	B4
Q15	C5
Q16	C5
Q17	B5
Q18	B5
Q23	A2
Q24	A3
Q27	D5
Q28	B5
Q29	B6
Q30	A2
Q31	A3
Q32	D4
D1	A4
D2	B5
D3	B5
D4	B5
D5	B6
D6	A3
D7	A3

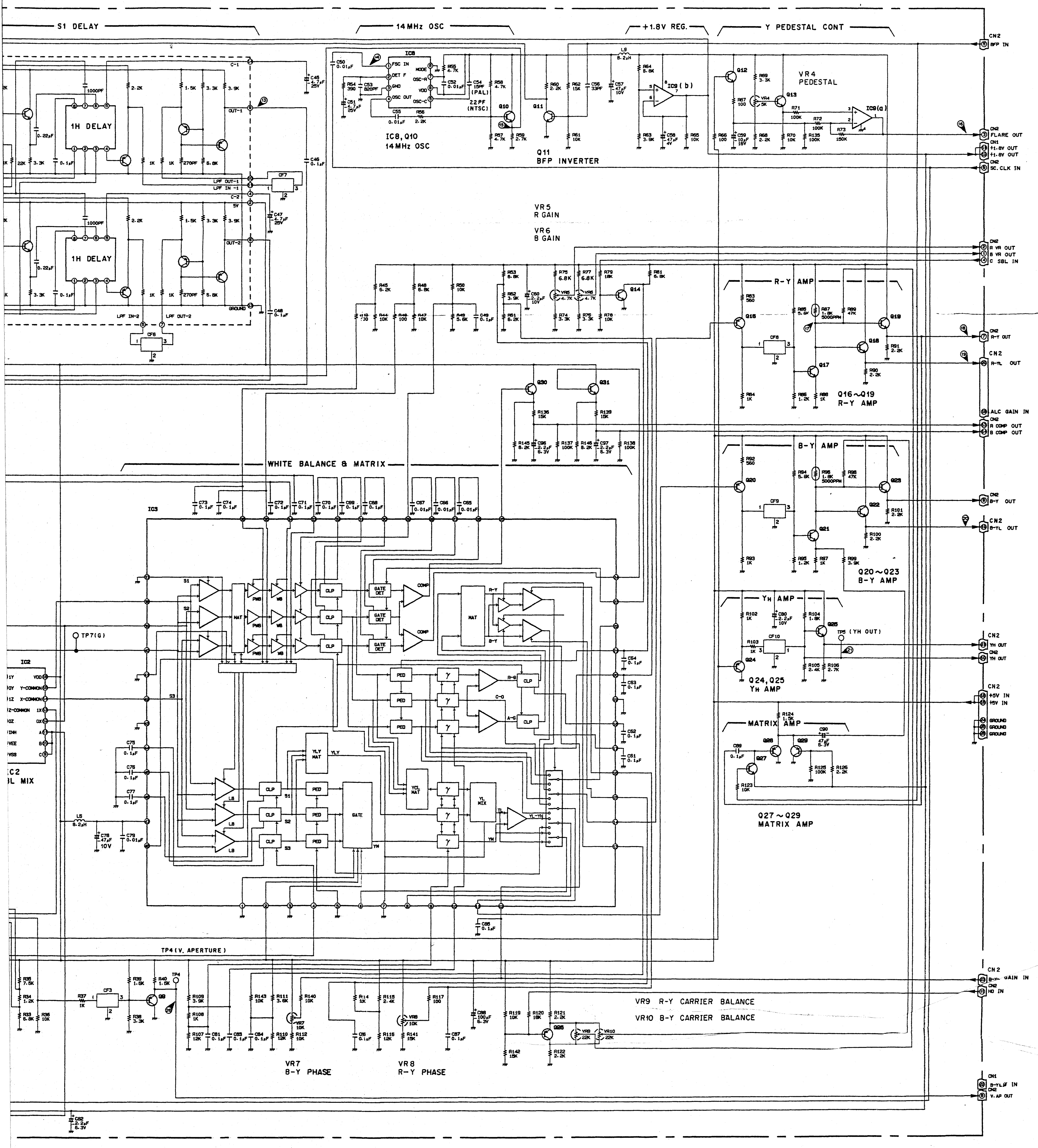
SCHEMATIC DIAGRAM OF

<Index>

IC1	B3
IC2	B4
IC3	B5
IC4	A2
IC5	A3
IC6	D2
IC7	D4
IC8	E6
IC9	E7
Q1	B1
Q2	A1
Q3	A1
Q4	A1
Q5	A2
Q6	A2
Q7	A3
Q8	A4
Q9	A4
Q10	E6
Q11	E6
Q12	E7
Q13	E7
Q14	D6
Q16	D7
Q17	D7
Q18	D7
Q19	D8
Q20	C7
Q21	C7
Q22	C7
Q23	C8
Q24	B7
Q25	C7
Q26	A6
Q27	B7
Q28	B7
Q29	B7
Q30	D6
Q31	D6


PROCESS SUB BOARD
S2 DELAY
S1 DELA
IC6
IC7
1H DELAY
1H DI
1H DE
OUT-1
BPF IN
CLK IN
IN-2
IC5V
LPF OUT-1
LPF IN-1
C-1
C-2
5V
OUT-2
GROUND
LPF IN-2
LPF OUT-2
CF4
CF5
L10 8.2μH
L7 8.2μH
L8 8.2μH
VR2 CHROMA FLICKER
VR11 C GAIN
VR3 EDGE BALANCE
CN1
BCH W/B IN
RCH W/B IN
DEMODULATOR
TP1 (C GAIN)
IC1
S1 IN
S2 IN
CLPO IN
CLP2 IN
SIG IN
+9V IN
ID IN
P BLK IN
TP6 (Y)
CF1
Q1
VR1 VH GAIN
CLPO
GC
LPS
LPF
CLP
MAX
SUCE
SW
MIX
1/2
γ
IC2
IC2 BL MIX
TP7
Y 1H DELAY
IC4
1H DELAY
CF2
Q2
Q3
Q4
Q5
Q6
Q7
Q8
30MHz OSC
IC5
FSC IN
DET F
GND
OSC OUT
MODE
OSC-R
VDD
OSC-C
22PF (PAL)
22PF (NTSC)
IC5, Q8 30MHz OSC
E
D
C
B
A
1
2
3
4

RAM OF PROCESS SUB BOARD


S1 DELAY
14MHz OSC
+1.8V REG.
Y PEDESTAL CONT
1H DELAY
1H DELAY
IC8
IC8, Q10
14MHz OSC
Q11
BFP INVERTER
IC9 (b)
VR4
PEDESTAL
IC9(a)
CN2 BFP IN
CN2 FLARE OUT
CN1 +1.8V OUT
+1.8V OUT
CN2 SC.CLK IN
VR5
R GAIN
VR6
B GAIN
CN2 R VR OUT
B VR OUT
C SBL IN
R-Y AMP
Q16～Q19
R-Y AMP
CN2 R-Y OUT
CN2 R-YL OUT
ALC GAIN IN
CN2 R COMP OUT
B COMP OUT
B-Y AMP
Q20～Q23
B-Y AMP
CN2 B-Y OUT
CN2 B-YL OUT
YH AMP
TP5 (YH OUT)
Q24, Q25
YH AMP
CN2 YH OUT
CN2 YH OUT
CN2 +5V IN
+5V IN
GROUND
GROUND
GROUND
MATRIX AMP
Q27～Q29
MATRIX AMP
WHITE BALANCE & MATRIX
IC3
TP7(G)
IC2
IC2
L MIX
MAT
PWB
WB
CLP
GATE DET
COMP
R-Y
B-Y
PED
γ
R-B
C-G
A-G
YLY MAT
YCL MAT
YL MIX
YL-YH
GATE
LB
S1
S2
S3
YM
TP4(V. APERTURE)
TP4
CF3
CF6
CF7
CF8
CF9
CF10
VR7
B-Y PHASE
VR8
R-Y PHASE
VR9 R-Y CARRIER BALANCE
VR10 B-Y CARRIER BALANCE
CN2 B-YL GAIN IN
CN2 HD IN
CN1 B-YL IN
CN2 V.AP OUT
4
5
6
7
8

<Voltages>

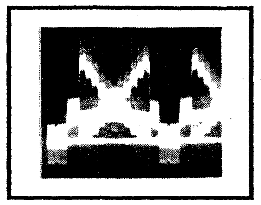
	IC2	IC4	IC5	IC6	IC7	IC8	IC9
Pin 1	1.9	1.0	2.6	1.8	1.8	2.6	1.3
2	1.8	8.9	2.2	5.0	5.0	2.0	2.0
3	2.0	0	0	1.9	1.9	0	2.0
4	2.0	4.9	3.2	3.3	3.3	3.2	0
5	1.8	5.0	3.2	3.9	3.9	3.0	1.8
6	0	0	5.0	5.0	5.0	5.0	1.8
7	0	5.9	3.8	3.9	9.9	3.6	0
8	0	1.8	0	0.8	0.8	0	5.0
9	4.2	4.4		0.8	0.8		
10	4.2			3.9	3.9		
11	4.2			3.9	3.9		
12	1.8			8.9	8.9		
13	2.0			0	0		
14	2.0			3.3	3.4		
15	1.9			3.3	2.2		
16	5.0			1.8	1.8		

	B	C	E
Q 1	0.9	0	1.5
2	1.8	4.0	1.2
3	4.0	5.0	3.3
4	0.1	1.9	1.8
5	1.9	5.0	1.2
6	1.2	0	1.9
7	4.8	5.0	4.2
8	2.5	5.0	1.9
9	3.1	0	3.8
10	2.5	5.0	1.9
11	0	4.5	0
12	2.9	5.0	2.5
13	2.6	5.0	2.0
14	0.2	0	0
16	3.0	1.7	3.5
17	1.7	2.9	1.1
18	2.9	5.0	2.3
19	2.9	5.0	2.3
20	0	0	0
21	1.6	3.01	1.0
22	3.1	5.0	2.5
23	3.1	5.0	2.5
24	2.7	0	3.3
25	0	0	0
26	2.4	2.0	3.1
27	0.1	1.8	1.8
28	1.8	0	2.0
29	1.8	0	2.4
30	3.9	5.0	3.3
31	1.1	5.0	0.4

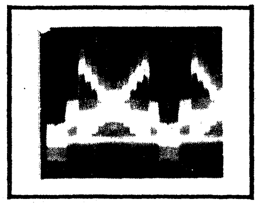
	IC1	IC3
Pin 1	4.2	0
2	3.2	5.0
3	3.9	0
4	2.9	0.1
5	2.9	0
6	2.0	3.0
7	2.0	0
8	3.7	2.8
9	1.1	3.7
10	2.2	4.0
11	1.1	3.0
12	2.0	3.7
13	2.0	3.9
14	1.8	2.9
15	1.9	4.3
16	3.1	4.6
17	3.4	3.4
18	3.2	3.3
19	0	0
20	2.5	1.9
21	2.6	3.0
22	2.4	2.9
23	2.9	3.3
24	2.4	1.1
25	3.9	2.8
26	3.1	1.9
27	4.6	1.9
28	2.5	1.9
29	2.5	1.8
30	2.6	3.5
31	2.6	3.5
32	4.3	3.5
33	2.8	1.1
34	2.8	0.6
35	2.9	3.0
36	2.9	3.1
37	3.1	0
38	3.5	2.0
39	3.5	1.9
40	5.0	2.1
41	0.1	0
42	0.1	2.0
43	0	0
44	2.9	3.3
45	3.7	3.5
46	2.8	3.4
47	0	5.0
48	2.9	2.5

<Waveforms>

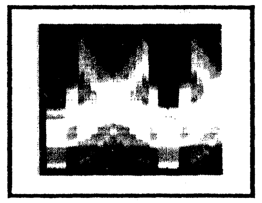
1. 10μsec/DIV, 0.1V/DIV



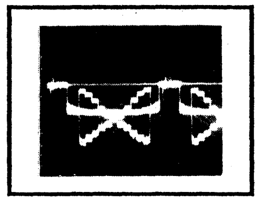
2. 10μsec/DIV, 0.1V/DIV



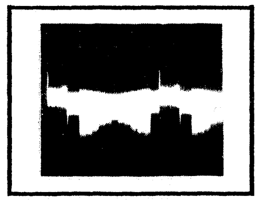
3. 10μsec/DIV, 0.1V/DIV



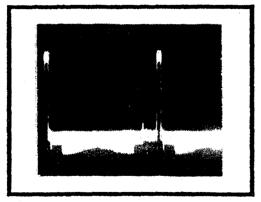
4. 10μsec/DIV, 0.1V/DIV



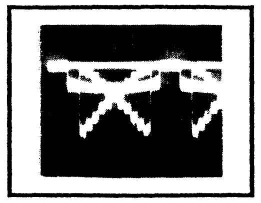
5. 10μsec/DIV, 20mV/DIV



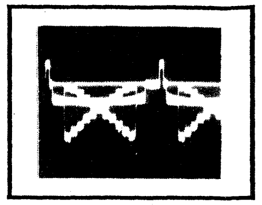
6. 10μsec/DIV, 50mV/DIV



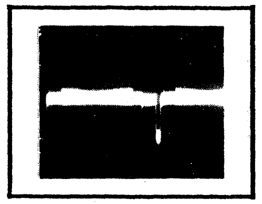
7. 10μsec/DIV, 50mV/DIV



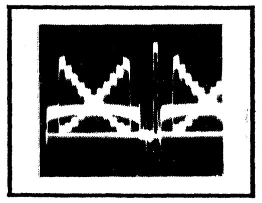
8. 10μsec/DIV, 50mV/DIV



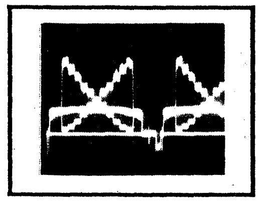
9. 10μsec/DIV, 50mV/DIV



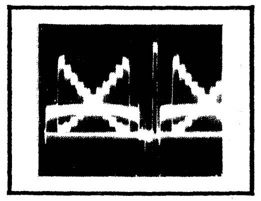
10. 10μsec/DIV, 50mV/DIV



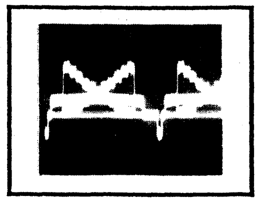
11. 10μsec/DIV, 0.1V/DIV



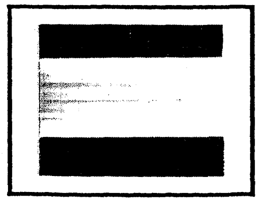
12. 10μsec/DIV, 50mV/DIV



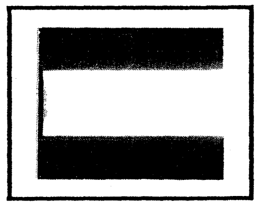
13. 10μsec/DIV, 50mV/DIV



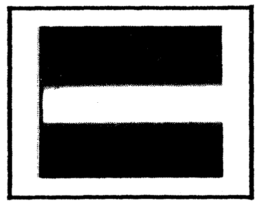
14. 10μsec/DIV, 0.2V/DIV



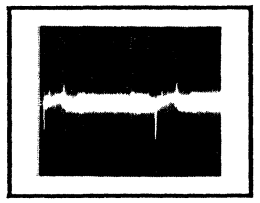
15. 10μsec/DIV, 0.2V/DIV



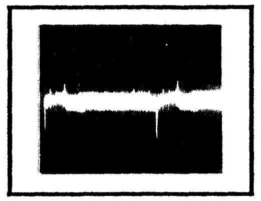
16. 5μsec/DIV, 20mV/DIV



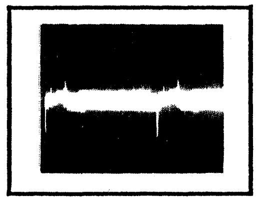
17. 10μsec/DIV, 50mV/DIV



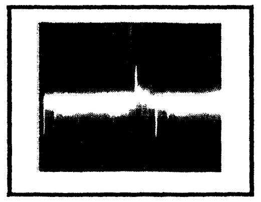
18. 10μsec/DIV, 50mV/DIV



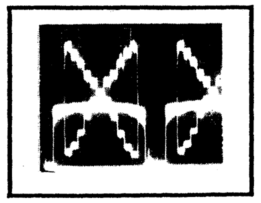
19. 10μsec/DIV, 50mV/DIV



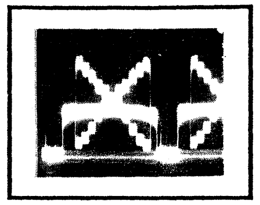
20. 10μsec/DIV, 50mV/DIV



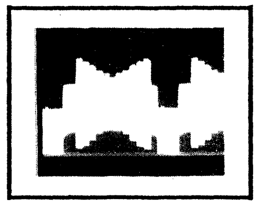
21. 10μsec/DIV, 50mV/DIV



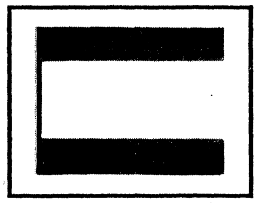
22. 10μsec/DIV, 50mV/DIV



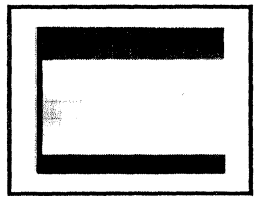
23. 10μsec/DIV, 0.1V/DIV



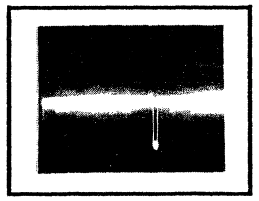
24. 10μsec/DIV, 0.2V/DIV



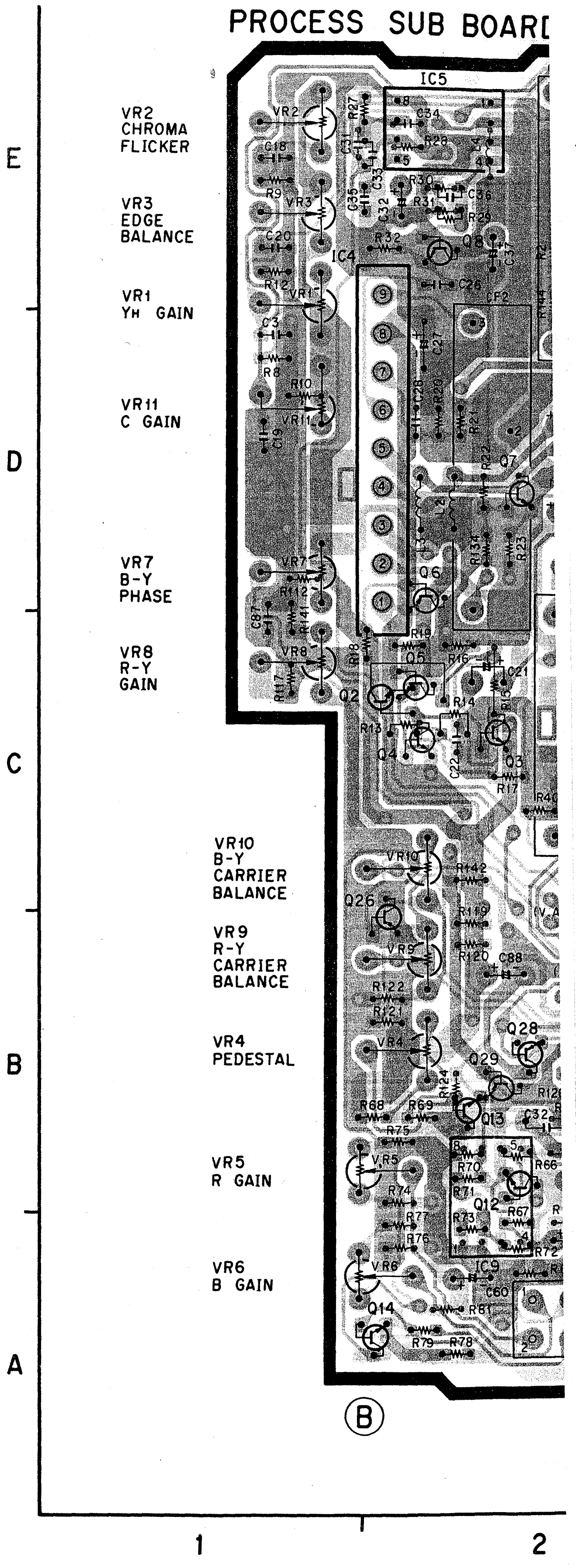
25. 10μsec/DIV, 0.1V/DIV



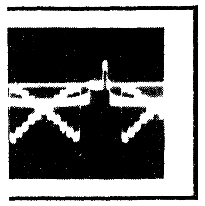
26. 10μsec/DIV, 50mV/DIV



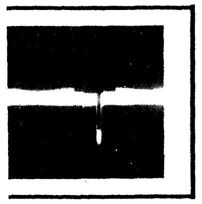
CONDUCTOR VIEW


PROCESS SUB BOARD
E
D
C
B
A
1
2
VR2 CHROMA FLICKER
VR3 EDGE BALANCE
VR1 YH GAIN
VR11 C GAIN
VR7 B-Y PHASE
VR8 R-Y GAIN
VR10 B-Y CARRIER BALANCE
VR9 R-Y CARRIER BALANCE
VR4 PEDESTAL
VR5 R GAIN
VR6 B GAIN
IC5
IC4
IC9
CF2
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q12
Q13
Q14
Q26
Q28
Q29
Ⓑ

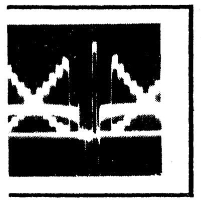
sec/DIV, 50mV/DIV



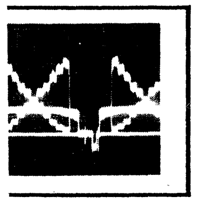
sec/DIV, 50mV/DIV



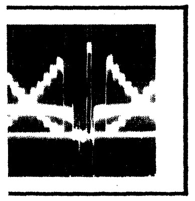
μsec/DIV, 50mV/DIV



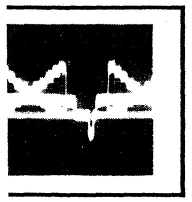
μsec/DIV, 0.1V/DIV



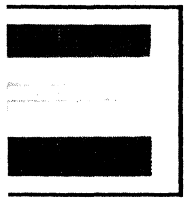
μsec/DIV, 50mV/DIV



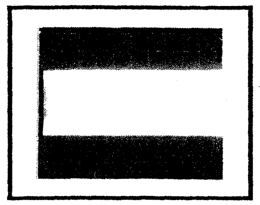
sec/DIV, 50mV/DIV



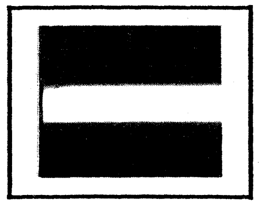
sec/DIV, 0.2V/DIV



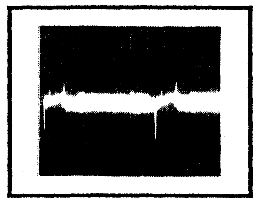
15. 10μsec/DIV, 0.2V/DIV



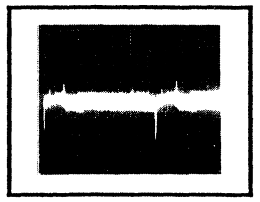
16. 5μsec/DIV, 20mV/DIV



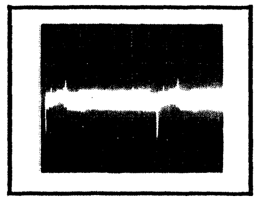
17. 10μsec/DIV, 50mV/DIV



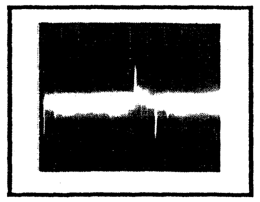
18. 10μsec/DIV, 50mV/DIV



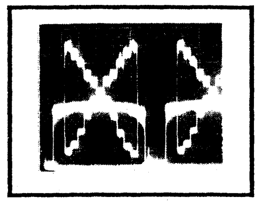
19. 10μsec/DIV, 50mV/DIV



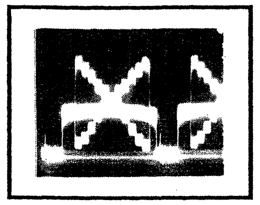
20. 10μsec/DIV, 50mV/DIV



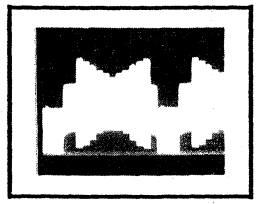
21. 10μsec/DIV, 50mV/DIV



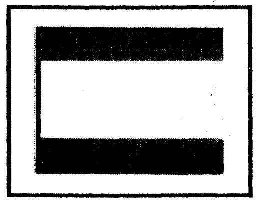
22. 10μsec/DIV, 50mV/DIV



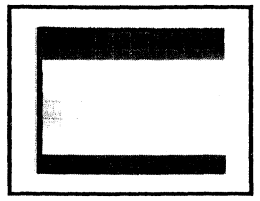
23. 10μsec/DIV, 0.1V/DIV



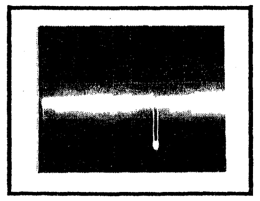
24. 10μsec/DIV, 0.2V/DIV



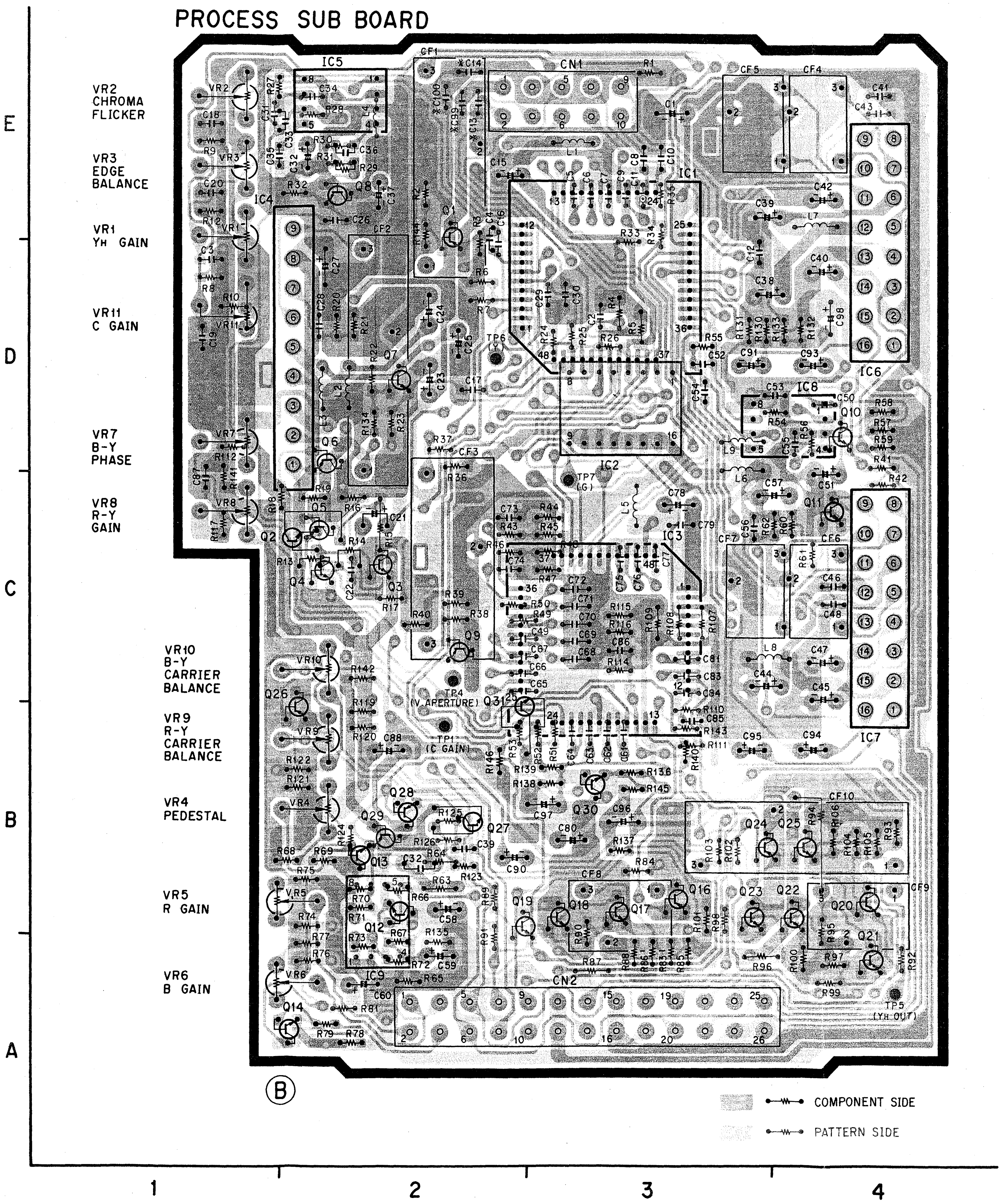
25. 10μsec/DIV, 0.1V/DIV



26. 10μsec/DIV, 50mV/DIV



CONDUCTOR VIEW OF PROCESS SUB BOARD


PROCESS SUB BOARD
VR2 CHROMA FLICKER
VR3 EDGE BALANCE
VR1 YH GAIN
VR11 C GAIN
VR7 B-Y PHASE
VR8 R-Y GAIN
VR10 B-Y CARRIER BALANCE
VR9 R-Y CARRIER BALANCE
VR4 PEDESTAL
VR5 R GAIN
VR6 B GAIN
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IC2
IC3
IC4
IC5
IC6
IC7
IC8
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TP4 (V APERTURE)
TP5 (YH OUT)
TP6
TP7 (G)
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D
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B
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4
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PATTERN SIDE

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IC4	D2
IC5	E2
IC6	E4
IC7	C4
IC8	D4
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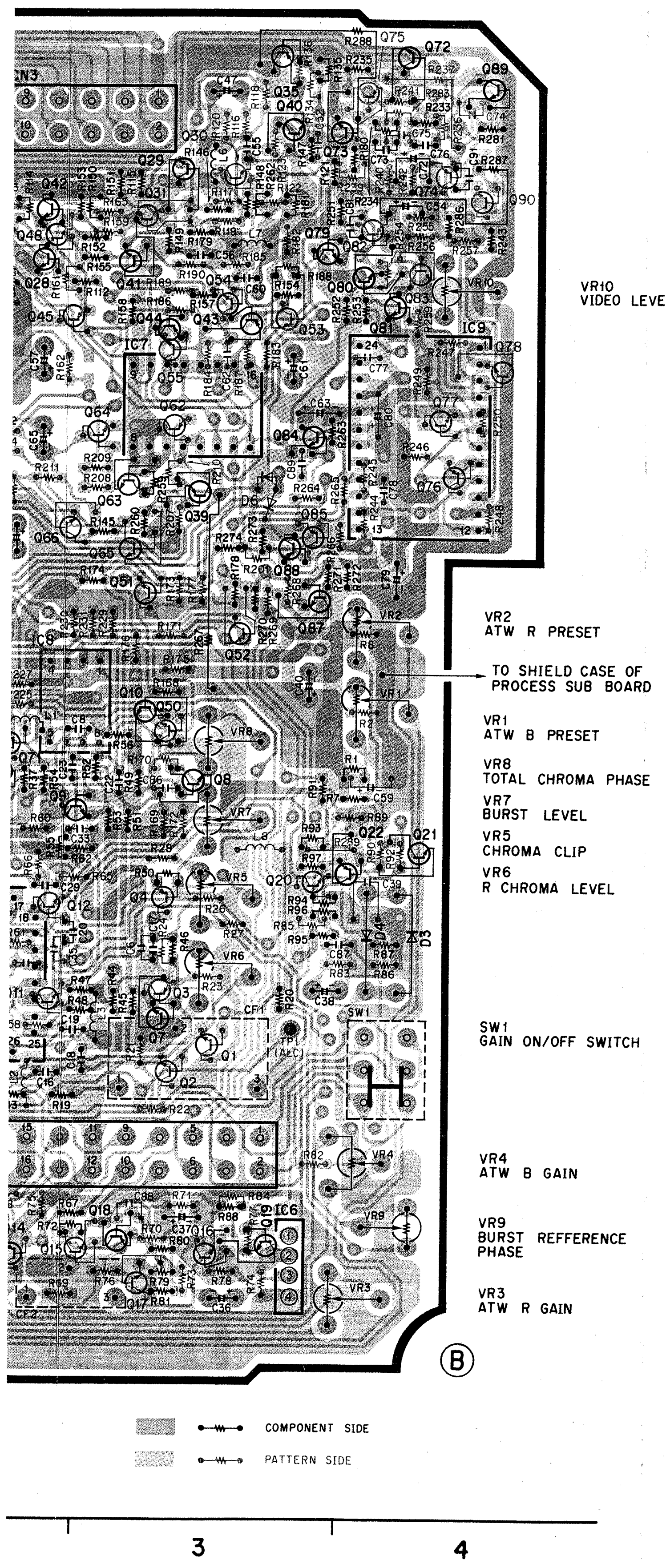
Q2	C2
Q3	C2
Q4	C2
Q5	C2
Q6	D2
Q7	D2
Q8	E2
Q9	C2
Q10	D4
Q11	C4
Q12	B2
Q13	B2
Q14	A2
Q16	B3
Q17	B3
Q18	B3
Q19	B3
Q20	B4
Q21	A4
Q22	B4
Q23	B3
Q24	B3
Q25	B4
Q26	B2
Q27	B2
Q28	B2
Q29	B2
Q30	B3
Q31	B2

EW OF PROCESS BOARD


VR10
VIDEO LEVEL
VR2
ATW R PRESET
TO SHIELD CASE OF
PROCESS SUB BOARD
VR1
ATW B PRESET
VR8
TOTAL CHROMA PHASE
VR7
BURST LEVEL
VR5
CHROMA CLIP
VR6
R CHROMA LEVEL
SW1
GAIN ON/OFF SWITCH
VR4
ATW B GAIN
VR9
BURST REFFERENCE
PHASE
VR3
ATW R GAIN
Ⓑ
COMPONENT SIDE
PATTERN SIDE
3
4

<Voltages>

	IC1	IC2	IC3	IC4	IC5	IC6	IC7	IC8	IC9
Pin 1	1.7	3.1	0.1	0	2.9	3.1	4.5	2.1	1.9
2	1.7	1.8	0.2	0	3.1	5.0	4.7	1.8	1.9
3	1.7	1.8	5.0	0	2.2	1.8	4.4	1.8	1.8
4	0	0	0	0	2.6	0	3.1	0	1.8
5	1.9	1.6	1.6	0	3.2		3.1	1.3	5.0
6	1.9	1.6	0	0	1.0		2.3	1.2	2.7
7	0	0.7	0	0	1.8		0	4.6	1.6
8	0	5.0	2.9	0	2.6		0	5.0	1.8
9			2.0	0	2.7		0.1		1.8
10			1.8	0	2.7		0.1		2.5
11			1.8	0	0.1		8.8		0
12			0	0	2.6		4.7		0
13			0.2	0	5.0		2.4		0
14			0.1	0	3.3		4.2		5.0
15				5.0	0		4.7		0
16				5.0	3.2		8.8		0.1
17					0.7				1.0
18					0.1				1.3
19					2.6				1.3
20					0				1.8
21					2.5				5.0
22					3.4				1.8
23					3.3				2.9
24					0.2				0.9
25					3.3				
26					1.2				
27					2.9				
28					2.7				
29					2.4				
30					0				

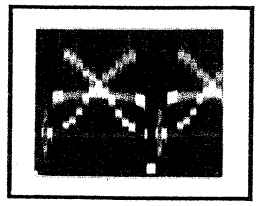
	B	C	E
Q 1	2.7	5.0	2.0
2	2.7	5.0	2.0
3	2.0	0	2.6
4	2.7	1.8	3.0
5	1.6	0	2.2
6	2.5	3.3	1.8
7	0	3.6	0.9
8	1.8	4.1	1.1
9	3.9	5.0	3.3
10	1.8	3.9	1.1
11	1.8	3.0	1.1
12	2.1	3.7	1.3
13	3.7	5.0	3.1
14	3.0	0	3.7
15	3.7	5.0	2.9
16	1.7	2.8	1.1
17	3.7	3.9	2.9
18	3.2	0.9	0
19	3.9	5.0	2.3
20	3.6	5.0	2.9
21	3.4	6.8	2.7
22	6.8	0	7.4
23	5.0	8.0	4.4
24	1.2	4.4	0.6
25	4.7	0	5.3
26	5.3	8.2	4.6
27	1.4	4.6	0.8

	B	C	E
Q28	0.6	0.1	0
29	4.5	8.8	3.9
30	2.4	4.9	1.8
31	4.9	8.8	4.3
35	4.5	0	5.1
36	0.6	0	0
37	5.0	8.7	8.8
38	0	8.8	0
39	8.1	8.8	8.8
40	3.0	5.0	2.4
41	2.4	5.0	1.8
42	5.0	8.8	4.4
43	5.1	4.1	4.3
44	3.5	4.1	4.2
45	3.9	0	4.6
48	4.7	7.8	4.0
49	1.1	4.0	0.5
50	1.9	5.0	1.3
51	2.4	4.7	1.7
52	4.7	8.8	4.1
53	4.5	8.8	3.9
54	2.3	5.1	1.7
55	5.1	8.8	4.5
62	4.0	0	4.6
63	0	4.6	0
64	0	1.2	0
65	4.7	7.7	4.0

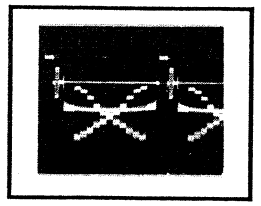
	B	C	E
Q66	1.2	4.0	0.5
67	0.2	3.3	0
68	0.6	0.6	0
69	1.4	0	0.6
70	1.8	3.0	0
71	3.0	5.0	2.4
72	1.9	5.0	2.4
73	0	2.4	0
74	3.1	0	3.7
75	3.7	1.2	3.0
76	3.1	1.2	3.7
77	1.8	4.7	1.2
78	4.6	8.8	4.0
79	4.7	8.8	4.1
80	0.1	1.8	2.5
81	0.1	2.5	1.8
82	1.9	0	2.5
83	2.5	8.8	1.9
84	3.6	5.0	2.9
85	0.1	0	-0.3
86	0	0.1	0.6
87	3.6	5.0	5.0
88	0	0	0.7
89	1.2	3.2	0.5
90	2.6	8.8	2.0

<Waveforms>

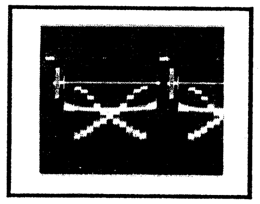
1. 10µsec/DIV, 20mV/DIV



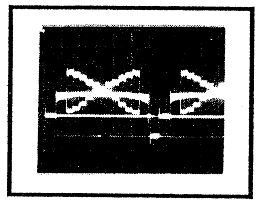
2. 10µsec/DIV, 0.2V/DIV



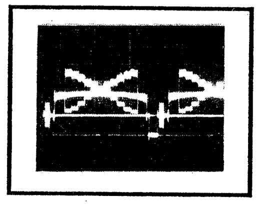
3. 10µsec/DIV, 0.2V/DIV



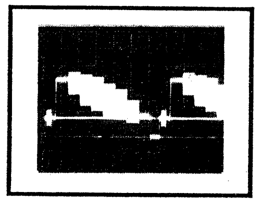
4. 10µsec/DIV, 0.5V/DIV



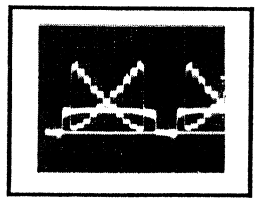
5. 10µsec/DIV, 0.5V/DIV



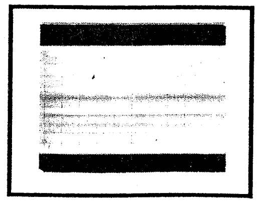
6. 10µsec/DIV, 0.5V/DIV



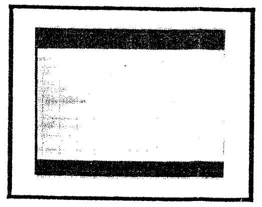
7. 10µsec/DIV, 50mV/DIV



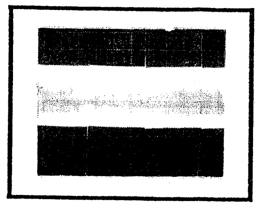
8. 10µsec/DIV, 0.2V/DIV



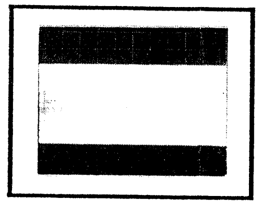
9. 10µsec/DIV, 0.2V/DIV



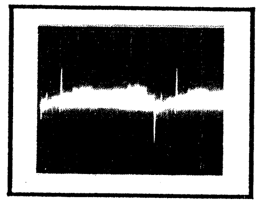
10. 20µsec/DIV, 0.2V/DIV



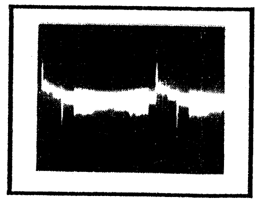
11. 20µsec/DIV, 0.1V/DIV



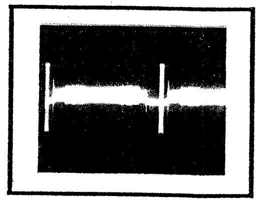
12. 10µsec/DIV, 50mV/DIV



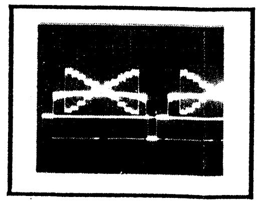
13. 10µsec/DIV, 50mV/DIV



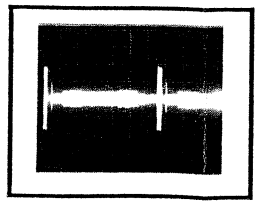
14. 10µsec/DIV, 0.1V/DIV



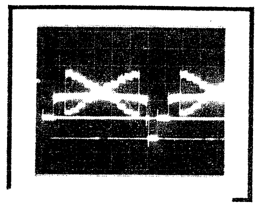
15. 10µsec/DIV, 0.5V/DIV



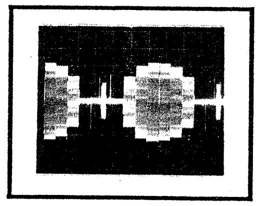
16. 10µsec/DIV, 0.2V/DIV



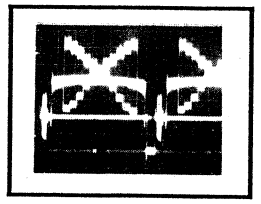
17. 10µsec/DIV, 0.5V/DIV



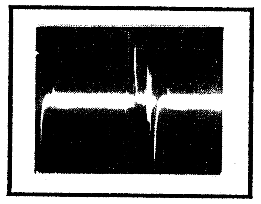
18. 10µsec/DIV, 0.2V/DIV



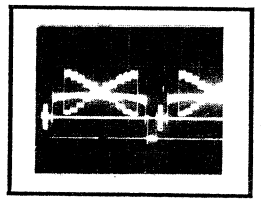
19. 10µsec/DIV, 0.1V/DIV



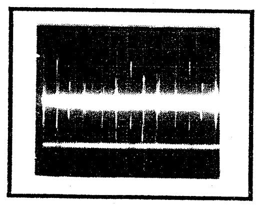
20. 10µsec/DIV, 50mV/DIV



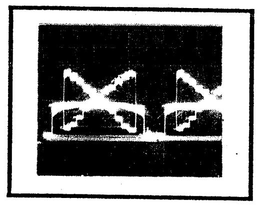
21. 10µsec/DIV, 0.5V/DIV



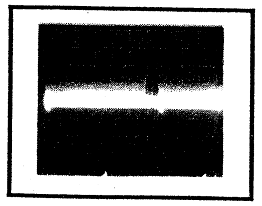
22. 2m sec/DIV, 50mV/DIV



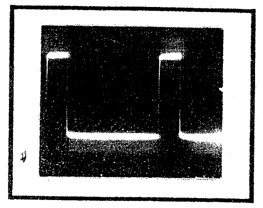
23. 10µsec/DIV, 0.1V/DIV



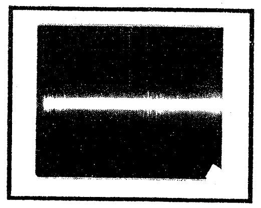
24. 10µsec/DIV, 20mV/DIV



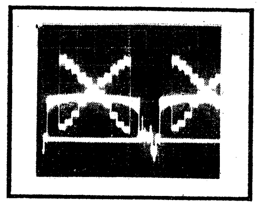
25. 10µsec/DIV, 1V/DIV



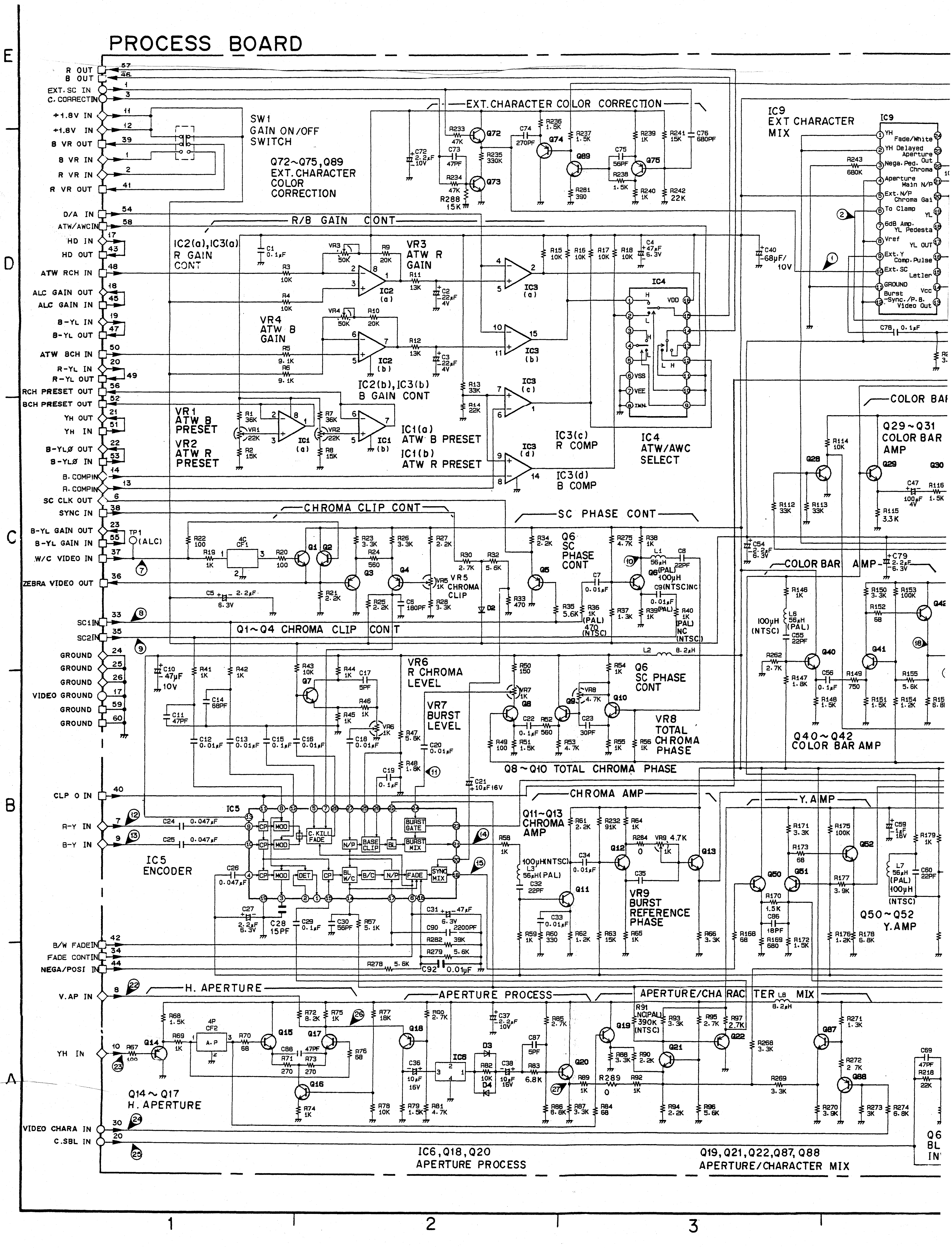
26. 10µsec/DIV, 20mV/DIV



27. 10µsec/DIV, 0.1V/DIV



SCHEMATIC DIAGRAM OF


PROCESS BOARD
E
D
C
B
A
1
2
3
R OUT
B OUT
EXT. SC IN
C. CORRECTIN
+1.8V IN
+1.8V IN
B VR OUT
B VR IN
R VR IN
R VR OUT
D/A IN
ATW/AWCIN
HD IN
HD OUT
ATW RCH IN
ALC GAIN OUT
ALC GAIN IN
B-YL IN
B-YL OUT
ATW BCH IN
R-YL IN
R-YL OUT
RCH PRESET OUT
BCH PRESET OUT
YH OUT
YH IN
B-YLØ OUT
B-YLØ IN
B. COMPIN
R. COMPIN
SC CLK OUT
SYNC IN
B-YL GAIN OUT
B-YL GAIN IN
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ZEBRA VIDEO OUT
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B-Y IN
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EXT.CHARACTER COLOR CORRECTION
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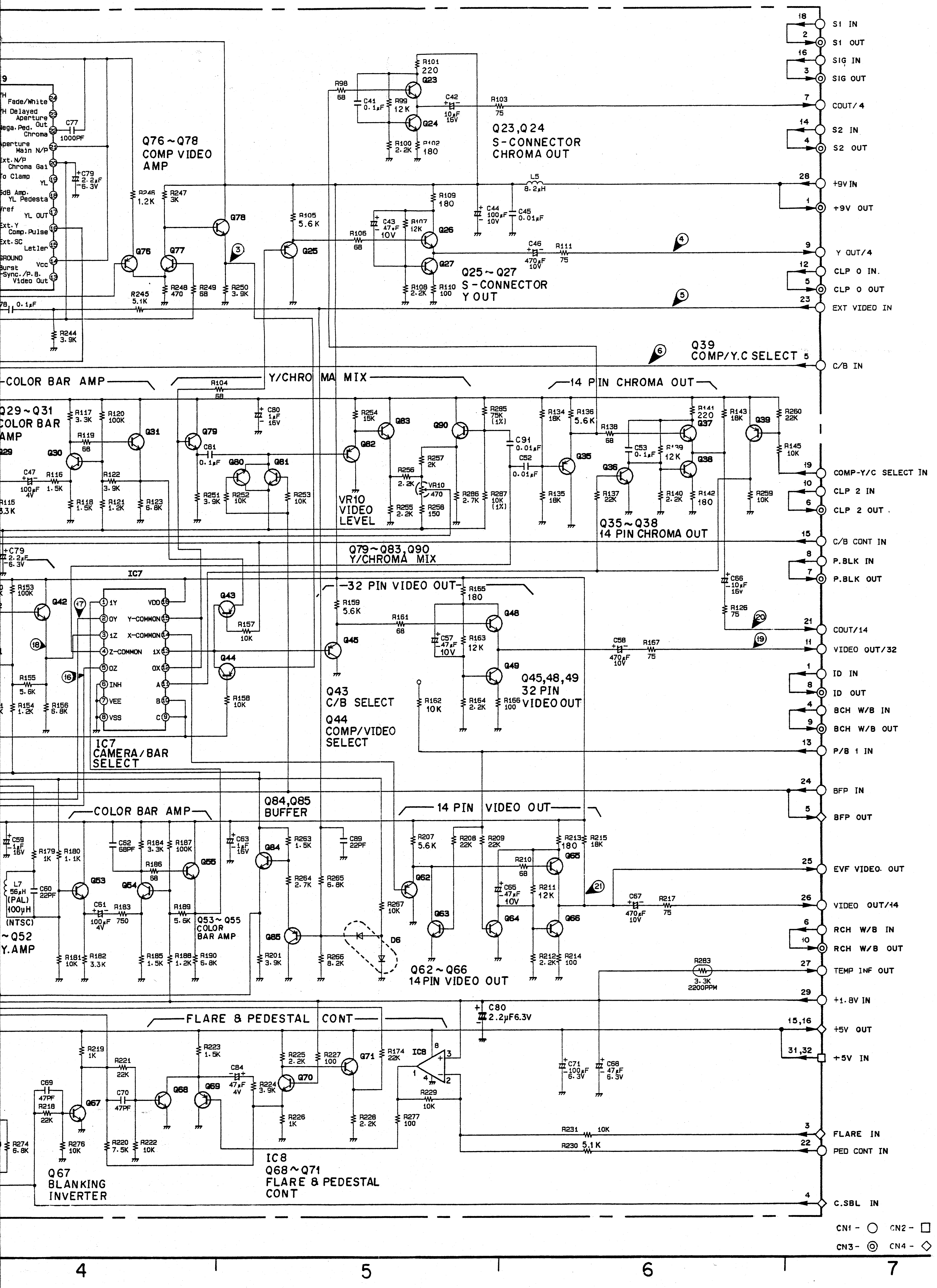
APERTURE/CHARACTER MIX
4C CF1
4P CF2
A.P
100μH(NTSC)
56μH(PAL)
Q6
BL
IN

M OF PROCESS BOARD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Q21	A3
Q22	A3
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Q24	D5
Q25	D5
Q26	D5
Q27	D5
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Q36	C6
Q37	C6
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Q45	C5
Q48	C5
Q49	B5
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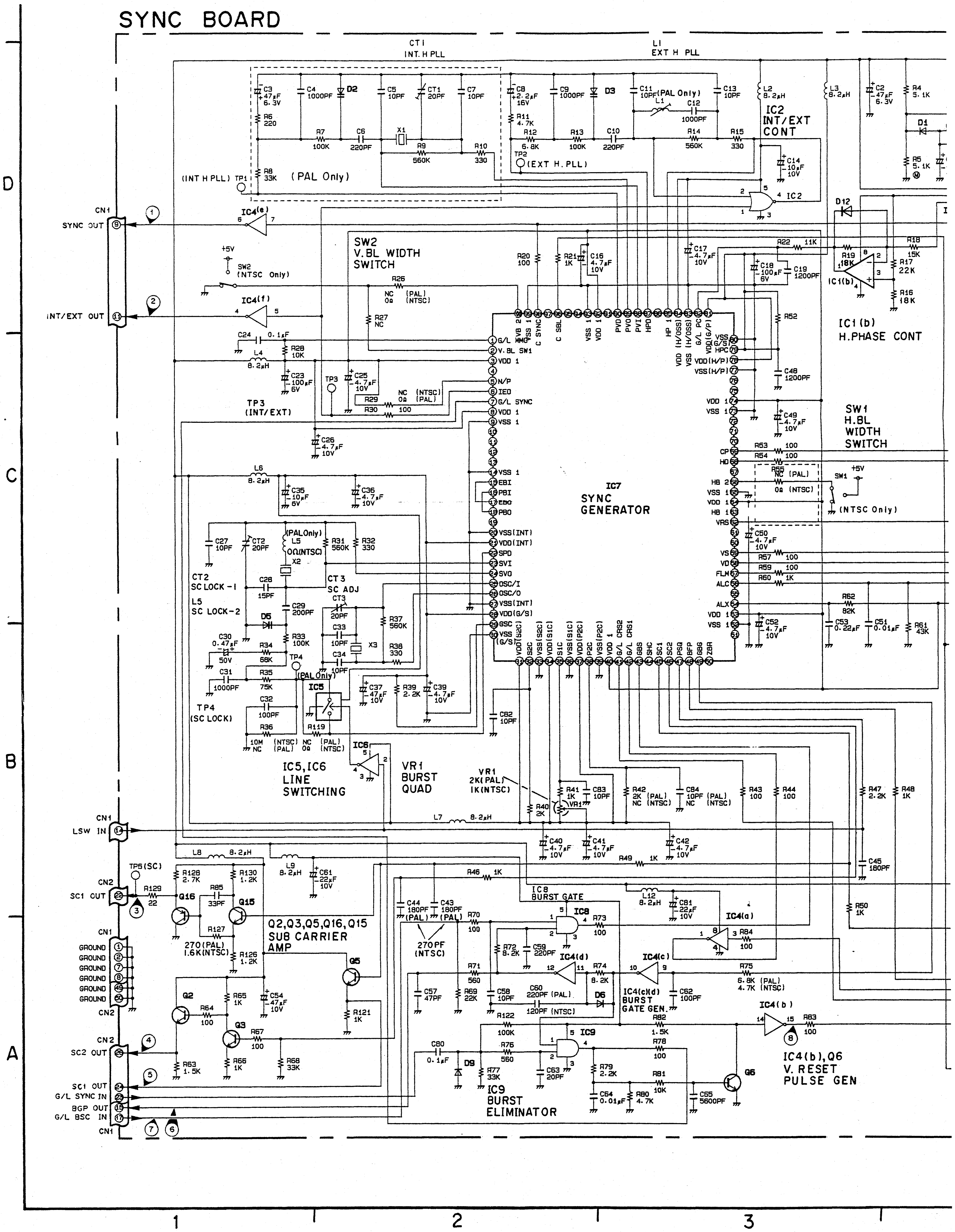
Q71	A5
Q72	D2
Q73	D2
Q74	D2
Q75	D3
Q76	D4
Q77	D4
Q78	D5
Q79	C4
Q80	C5
Q81	C5
Q82	C5
Q83	C5
Q84	B5
Q85	B5
Q87	A4
Q88	A4
Q89	D3
Q90	C5
D2	C2
D3	A2
D4	A2
D6	B5

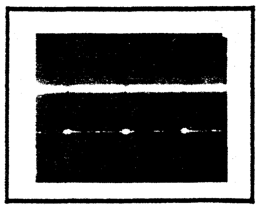
SCHEMATIC DIAGRA

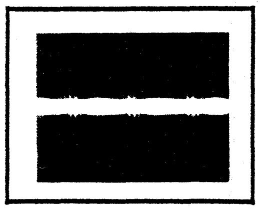

SYNC BOARD
D
C
B
A
1
2
3
CT1
INT. H PLL
L1
EXT H PLL
(PAL Only)
(INT H PLL) TP1
TP2 (EXT H. PLL)
IC2 INT/EXT CONT
IC4(e)
IC4(f)
CN1
SYNC OUT
INT/EXT OUT
SW2 V. BL WIDTH SWITCH
SW2 (NTSC Only)
+5V
TP3 (INT/EXT)
IC7 SYNC GENERATOR
IC1(b) H.PHASE CONT
SW1 H.BL WIDTH SWITCH
(NTSC Only)
CT2 SC LOCK-1
L5 SC LOCK-2
CT3 SC ADJ
TP4 (SC LOCK)
IC5,IC6 LINE SWITCHING
VR1 BURST QUAD
VR1 2K(PAL) 1K(NTSC)
LSW IN
TP5(SC)
CN2
SC1 OUT
GROUND
Q2,Q3,Q5,Q16,Q15 SUB CARRIER AMP
IC8 BURST GATE
IC4(c)(d) BURST GATE GEN.
IC4(b),Q6 V. RESET PULSE GEN
IC9 BURST ELIMINATOR
SC2 OUT
SC1 OUT
G/L SYNC IN
BGP OUT
G/L BSC IN
①
②
③
④
⑤
⑥
⑦
⑧

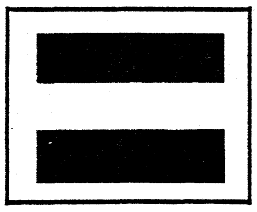
<Index>

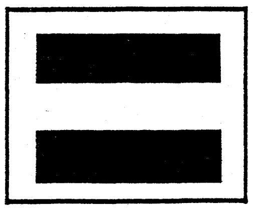
IC1	D4
IC2	D3
IC3	D4
IC4	A3
IC5	B2
IC6	B2
IC7	D4
IC8	A2
IC9	A2
IC11	C6
IC12	A4
IC13	B5
IC14	B5
Q1	D4
Q2	A1
Q3	A1
Q5	A2
Q6	A3
Q8	D5
Q9	D5
Q10	C6
Q11	B6
Q12	B6
Q13	C6
Q14	B4
Q15	B1
Q16	B1
Q17	C6
D1	D4
D2	D2
D3	D3
D4	D4
D5	B1
D6	A3
D7	B5
D8	B5
D9	A2
D10	C6
D12	D3

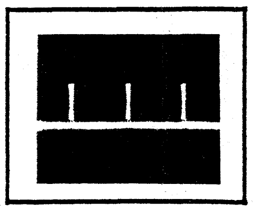
<Waveforms>

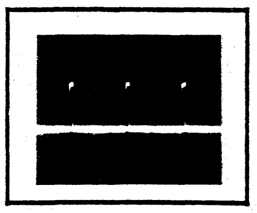

1. 20μsec/DIV, 2V/DIV

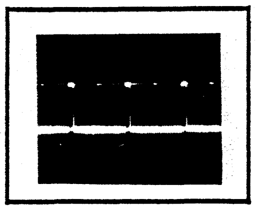

2. 20μsec/DIV, 20mV/DIV

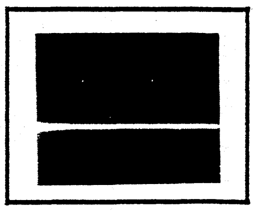

3. 10μsec/DIV, 0.5V/DIV

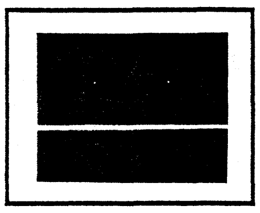

4. 10μsec/DIV, 0.5V/DIV

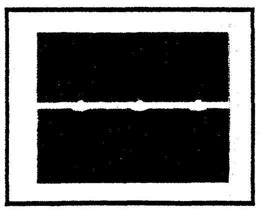

5. 20μsec/DIV, 2V/DIV

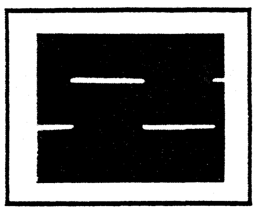

6. 20μsec/DIV, 2V/DIV

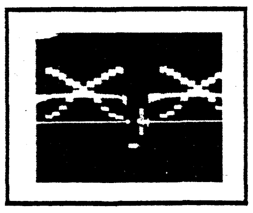

7. 20μsec/DIV, 2V/DIV

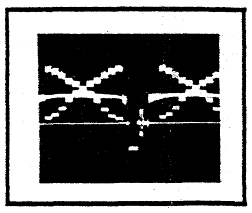

8. 5m sec/DIV, 2V/DIV

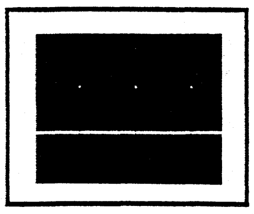

13. 5m sec/DIV, 2V/DIV

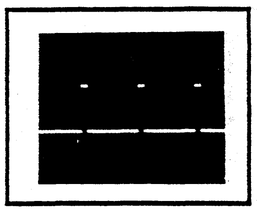

14. 20μsec/DIV, 0.1V/DIV


15. 5m sec/DIV, 2V/DIV


16. 10μsec/DIV, 0.2V/DIV


17. 10μsec/DIV, 0.2V/DIV


18. 20μsec/DIV, 2V/DIV


19. 20μsec/DIV, 2V/DIV

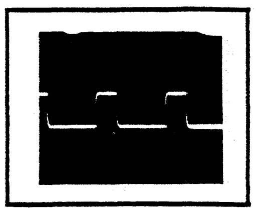
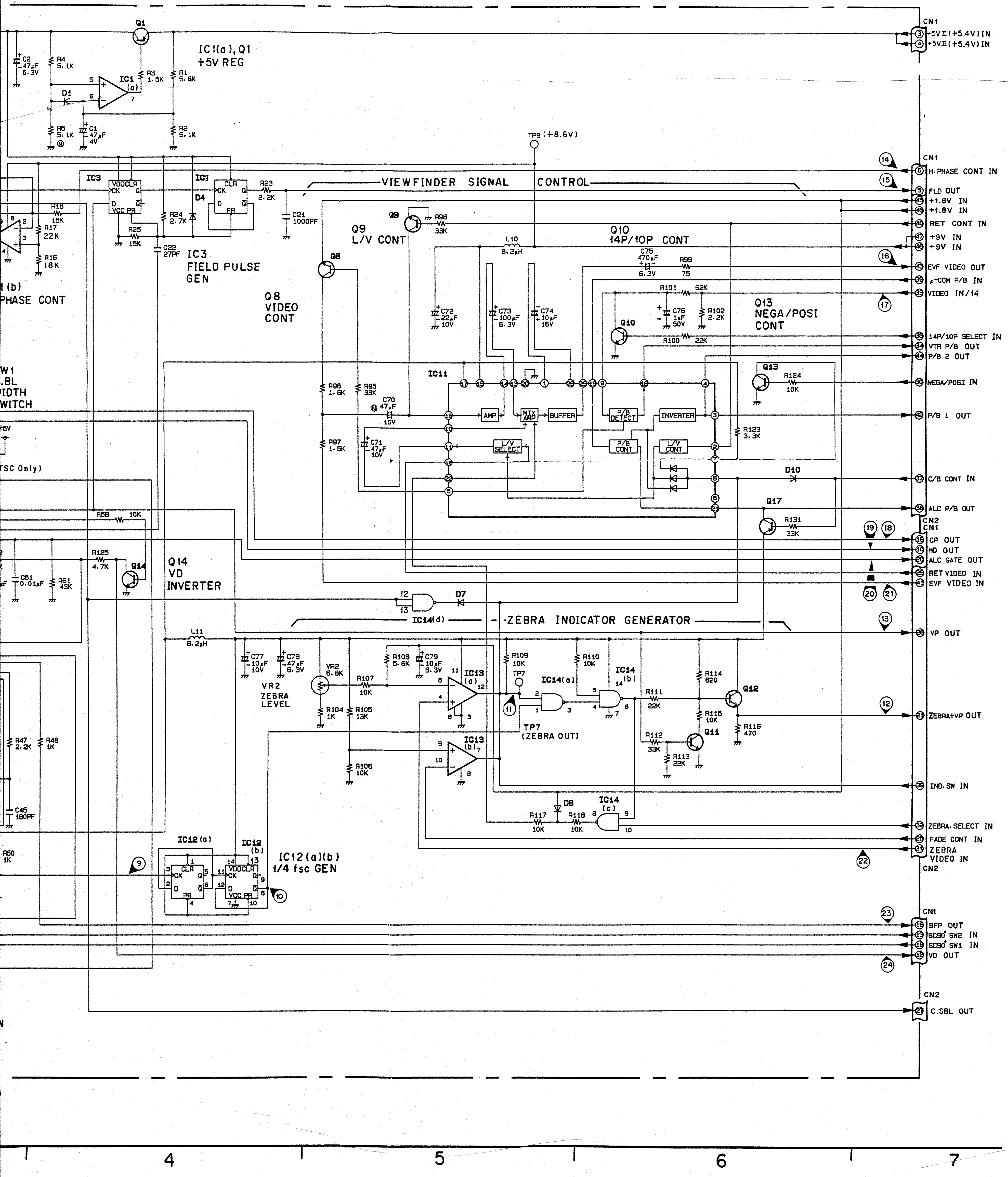
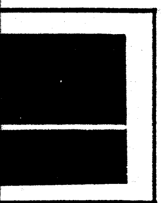

20. 5m sec/DIV, 1V/DIV

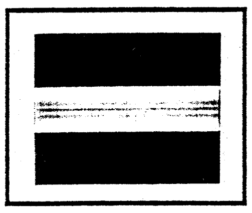
DIAGRAM OF SYNC BOARD


CN1
+5VII(+5.4V)IN
+5VII(+5.4V)IN
Q1
IC1(a),Q1
+5V REG
C2 47µF 6.3V
R4 5.1K
R3 1.5K
R1 5.6K
IC1 (a)
D1
R5 5.1K
C1 47µF 4V
R2 5.1K
TP8 (+8.6V)
IC3
D4
R23 2.2K
VIEWFINDER SIGNAL CONTROL
R18 15K
R17 22K
R16 18K
R24 2.7K
R25 15K
C21 1000PF
C22 27PF
IC3
FIELD PULSE
GEN
Q9
R98 33K
Q9
L/V CONT
Q10
14P/10P CONT
L10 8.2µH
C75 470µF 6.3V
R99 75
Q8
(b)
PHASE CONT
Q8
VIDEO
CONT
C72 22µF 10V
C73 100µF 6.3V
C74 10µF 16V
R101 62K
C76 1µF 50V
R102 2.2K
Q10
R100 22K
Q13
NEGA/POSI
CONT
Q13
R124 10K
IC11
R96 1.6K
R95 33K
C70 47µF 10V
AMP
MIX AMP
BUFFER
P/B DETECT
INVERTER
R97 1.5K
C71 47µF 10V
L/V SELECT
P/B CONT
L/V CONT
R123 3.3K
D10
Q17
R131 33K
W1
.BL
IDTH
WITCH
5V
TSC Only)
R58 10K
R125 4.7K
Q14
Q14
VD
INVERTER
C51 0.01µF
R61 43K
D7
IC14(d)
ZEBRA INDICATOR GENERATOR
L11 8.2µH
C77 10µF 10V
C78 47µF 6.3V
VR2 5.6K
VR2
ZEBRA
LEVEL
R108 5.6K
C79 10µF 6.3V
IC13 (a)
R107 10K
R104 1K
R105 13K
R109 10K
TP7
IC14(a)
R110 10K
IC14 (b)
R114 620
Q12
R111 22K
R115 10K
Q11
R116 470
TP7
(ZEBRA OUT)
R112 33K
R113 22K
IC13 (b)
R106 10K
R47 2.2K
R48 1K
C45 180PF
D8
IC14 (c)
R117 10K
R118 10K
R50 1K
IC12 (a)
IC12 (b)
IC12(a)(b)
1/4 fsc GEN
CN1
H.PHASE CONT IN
FLD OUT
+1.8V IN
+1.8V IN
RET CONT IN
+9V IN
+9V IN
EVF VIDEO OUT
µ-COM P/B IN
VIDEO IN/14
14P/10P SELECT IN
VTR P/B OUT
P/B 2 OUT
NEGA/POSI IN
P/B 1 OUT
C/B CONT IN
ALC P/B OUT
CN2
CN1
CP OUT
HD OUT
ALC GATE OUT
RET VIDEO IN
EVF VIDEO IN
VP OUT
ZEBRA+VP OUT
IND.SW IN
ZEBRA.SELECT IN
FADE CONT IN
ZEBRA
VIDEO IN
CN2
CN1
BFP OUT
SC90° SW2 IN
SC90° SW1 IN
VD OUT
CN2
C.SBL OUT
4
5
6
7

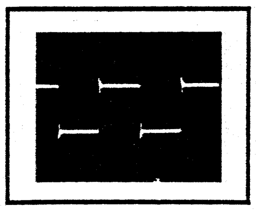
/DIV, 2V/DIV



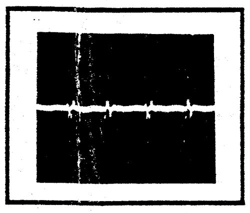
9. 0.1m sec/DIV, 2V/DIV



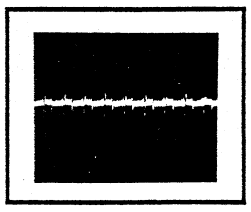
10. 0.2µsec/DIV, 2V/DIV



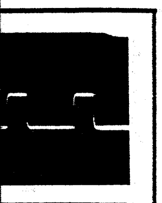
11. 0.2µsec/DIV, 20mV/DIV



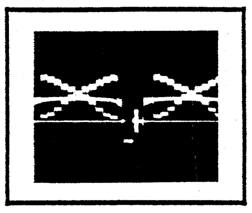
12. 0.2µsec/DIV, 20mV/DIV



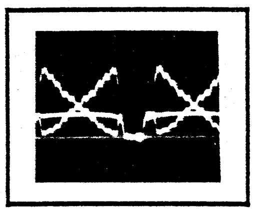
ec/DIV, 1V/DIV



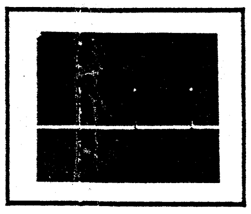
21. 10µsec/DIV, 0.5V/DIV



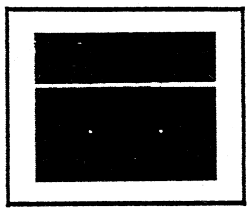
22. 10µsec/DIV, 50mV/DIV



23. 20µsec/DIV, 2V/DIV



24. 5m sec/DIV, 2V/DIV



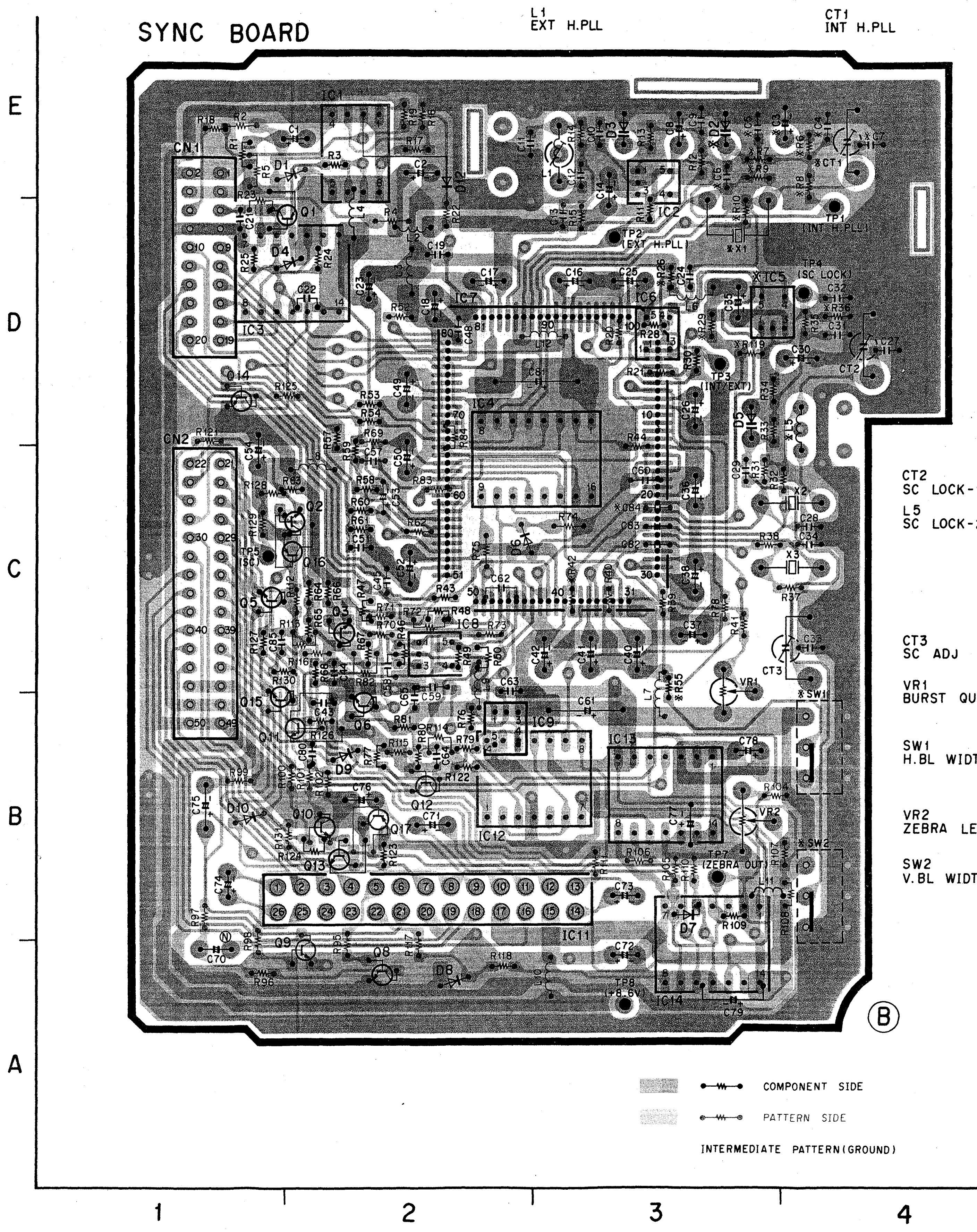
CONDUCTOR VIEW OF SYNC BOARD

< Voltages >

	IC1	IC2	IC3	IC4	IC5	IC6	IC8	IC9	IC11	IC12	IC13	IC14
Pin 1	4.5	5.2	5.2	5.2	0	0	0	5.2	1.4	5.2	0	1.2
2	4.5	0	2.6	5.2	0	2.6	0	0	0	0.6	0	0.2
3	4.5	0	0	0.1	0	0	0	0	0	2.3	0	5.2
4	0	0	0	0	2.6	2.6	0	0	0	5.2	2.4	5.2
5	2.6	-	2.6	5.2	5.2	5.2	5.2	5.2	4.9	0	2.3	5.2
6	0		2.6	4.5					5.1	0.6	0	0
7	0		0	0					5.1	0	3.8	0
8	0		5.1	0					3.8	1.1	0	5.2
9			0	0					0	1.1	0	0
10			4.4	5.2					1.7	5.2	1.0	5.1
11			0.4	5.2					0	0.6	-	3.4
12			0	0					0	1.1	3.8	1.2
13			5.2	0					1.7	5.2	0	1.2
14			5.2	5.2					4.1	5.2	0	5.2
15				0					8.9			
16				0					4.8			
17									5.2			
18									0			
19									0			
20									0			
21									0			
22									1.7			
23									0			
24									0			
25									4.7			
26									7.8			

	Pin 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
IC7	5.2	5.2	5.2	5.2	0	5.2	0	5.2	0	5.2	5.2	5.2	5.2	0	-8.4	-8.4	-8.4	-8.4	-8.4	0
	Pin21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
IC7	0	0	4.9	5.2	0	16.0	0	5.2	0.4	0	5.2	0.6	0	5.2	0.7	0	5.2	0.4	0	5.2
	Pin41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
IC7	5.2	5.2	0	5.1	-8.8	-8.8	2.6	0	0	-0.7	2.2	0	5.2	0.5	.-	0	0	0.2	0	0.4
	Pin61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
IC7	0	0	5.2	0	0	5.2	0	0	0.1	0	0.4	0	0	-	-	-	0	5.2	0.3	0
	Pin81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
IC7	5.2	0	0	5.1	0	5.2	0	2.5	0.4	2.2	5.2	5.2	0	0	0.1	1.3	1.1	0.4	0	5.2

	B	C	E
Q 1	4.7	5.2	5.4
2	3.4	5.0	2.9
3	2.3	3.7	0
5	2.3	0	1.6
6	0	5.2	0
8	2.3	1.9	1.8
9	0	4.8	0
10	0	0	0
11	0	5.0	0
12	5.0	5.2	4.2
14	0	5.0	0
15	2.3	0	1.7
16	1.6	0	2.2
17	5.0	0	5.2


SYNC BOARD
L1
EXT H.PLL
CT1
INT H.PLL
E
D
C
B
A
1
2
3
4
CN1
CN2
IC1
IC2
IC3
IC4
IC6
IC7
IC8
IC9
IC11
IC12
IC13
IC14
TP1 (INT H.PLL)
TP2 (EXT H.PLL)
TP3 (INT/EXT)
TP4 (SC LOCK)
TP5 (SC)
TP7 (ZEBRA OUT)
TP8 (-8.6V)
CT2
CT3
VR1
VR2
X1
X2
X3
※SW1
※SW2
Ⓑ
CT2
SC LOCK-1
L5
SC LOCK-2
CT3
SC ADJ
VR1
BURST QUAD
SW1
H.BL WIDTH SWITCH
VR2
ZEBRA LEVEL
SW2
V.BL WIDTH SWITCH
COMPONENT SIDE
PATTERN SIDE
INTERMEDIATE PATTERN(GROUND)

※

Ref.No	PAL	NTSC
IC5	○	×
D2	○	×
R6	○	×
R7	○	×
R8	○	×
R9	○	×
R10	○	×
R26	×	J
R29	J	×
R36	×	○
R42	○	×
R55	×	J
R119	×	J
C3	○	×
C4	○	×
C5	○	×
C6	○	×
C7	○	×
C84	○	×
CT1	○	×
L5	○	J
X1	○	J
SW1	×	○
SW2	×	○

○ : USED
× : NOT USED
J : JUMPER

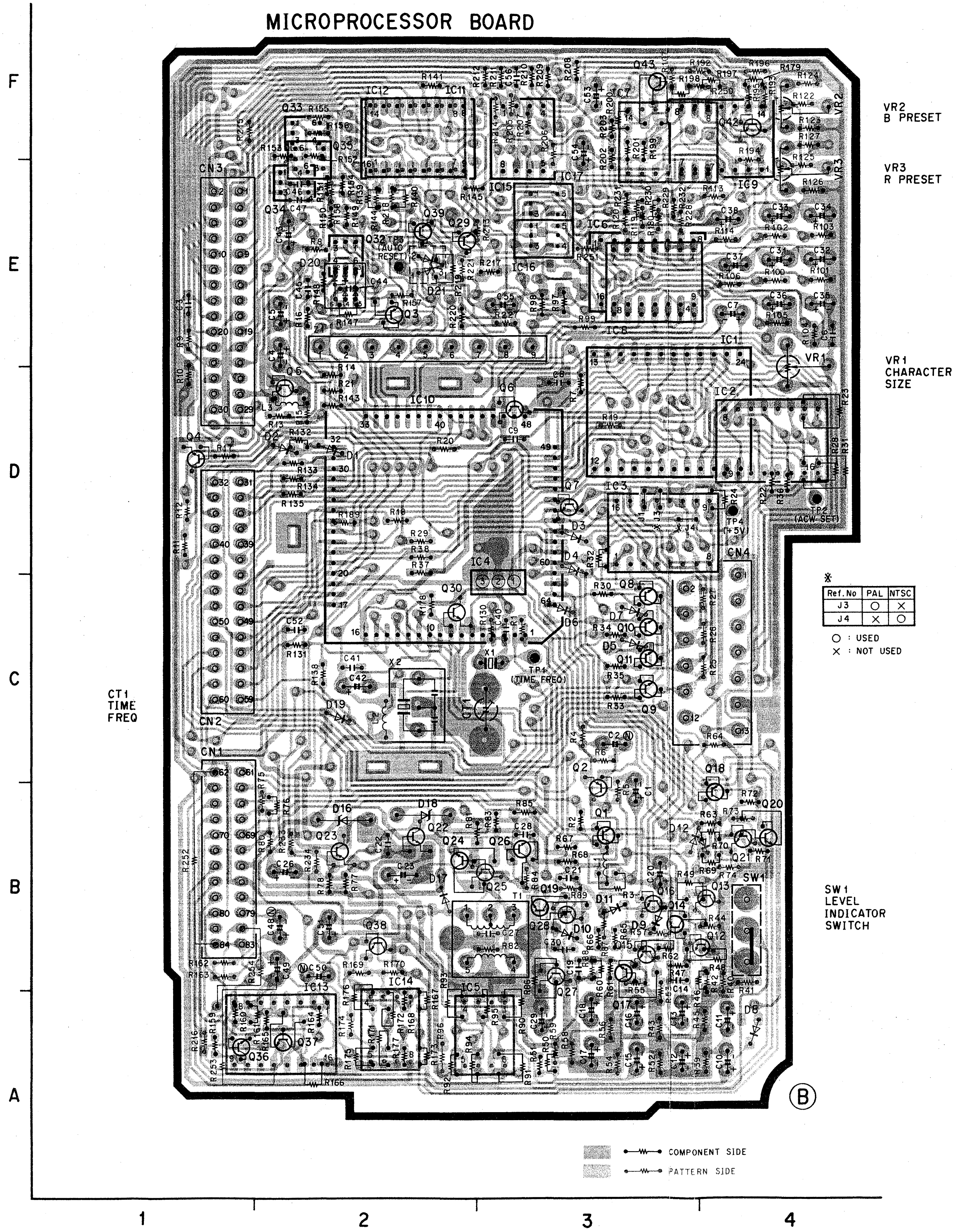
<Index>

IC1	E2
IC2	E3
IC3	D2
IC4	C3
IC5	D3
IC6	D3
IC7	C3
IC8	C2
IC9	B2
IC11	B2
IC12	B3
IC13	B3
IC14	A3
Q1	D2
Q2	C2
Q3	C2
Q5	C1
Q6	B2
Q8	A2
Q9	A2
Q10	B2
Q11	B2
Q12	B2
Q13	B2
Q14	D1
Q15	B1
Q16	C2
Q17	B2
D1	E2
D2	E3
D3	E3
D4	D2
D5	D3
D6	C2
D7	B3
D8	A2
D9	B2
D10	B1
D12	E2

CONDUCTOR VIEW OF MICROPROCESSOR BOARD

<Index>

IC1	D3	Q42	F4
IC2	D4	Q43	F3
IC3	D3	D1	D2
IC4	C3	D2	D2
IC5	A3	D3	D3
IC6	E3	D4	D3
IC7	F3	D5	C3
IC8	E3	D6	C3
IC9	F4	D7	C3
IC10	D2	D8	A4
IC11	F2	D9	B3
IC12	F2	D10	B3
IC13	A2	D11	B3
IC14	A2	D12	B4
IC15	F3	D16	B2
IC16	E3	D17	B2
IC17	E3	D18	B2
Q1	B3	D19	C2
Q2	B3	D20	E2
Q3	E2	D21	E2
Q4	D1		
Q5	D2		
Q6	D3		
Q7	D3		
Q8	C3		
Q9	C3		
Q10	C3		
Q11	C3		
Q12	B4		
Q13	B4		
Q14	B3		
Q15	B3		
Q16	B3		
Q17	B3		
Q18	B4		
Q19	B3		
Q20	B4		
Q21	B4		
Q22	B2		
Q23	B2		
Q24	B2		
Q25	B3		
Q26	B3		
Q27	B3		
Q28	B3		
Q29	E2		
Q30	C2		
Q32	E2		
Q33	F2		
Q34	E2		
Q35	E2		
Q36	A1		
Q37	A2		
Q38	B2		
Q39	E2		


MICROPROCESSOR BOARD
F
E
D
C
B
A
1
2
3
4
VR2
B PRESET
VR3
R PRESET
VR1
CHARACTER
SIZE
CT1
TIME
FREQ
SW1
LEVEL
INDICATOR
SWITCH
TP2
(ACW SET)
TP4
(+5V)
TP1
(TIME FREQ)
AUTO
RESET
IC1
IC2
IC3
IC4
IC5
IC6
IC8
IC9
IC10
IC11
IC12
IC13
IC14
IC15
IC16
IC17
CN1
CN2
CN3
CN4
X1
X2
T1
Ⓑ
COMPONENT SIDE
PATTERN SIDE

※

Ref.No	PAL	NTSC
J3	○	×
J4	×	○

○ : USED
× : NOT USED

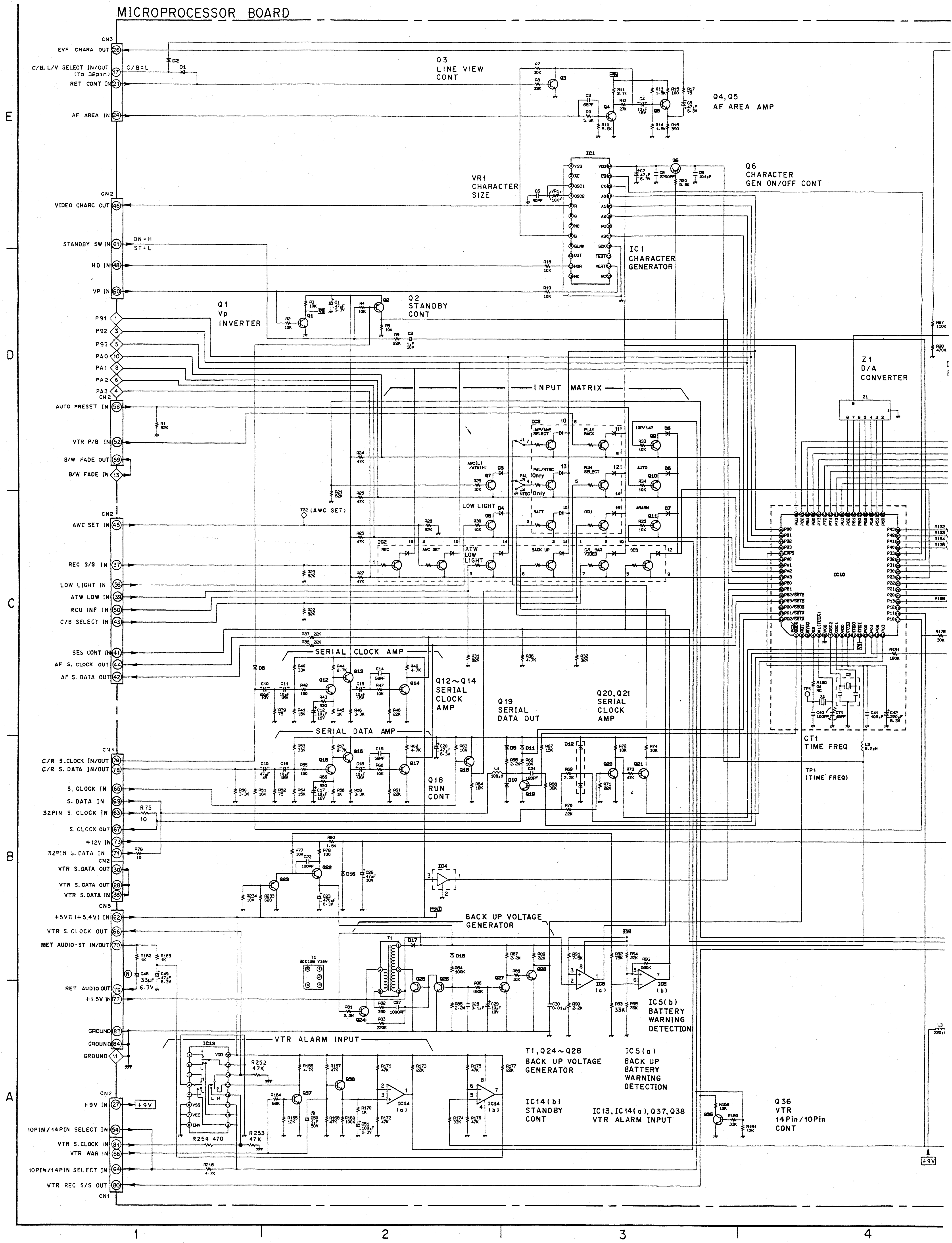
	IC1	IC2	IC3	IC4	IC5	IC6	IC7	IC8	IC9	IC11	IC12	IC13	IC14	IC15	IC16	IC17
Pin 1	0	0	0	5.4	0	1.9	0.9	1.8	2.7	1.8	5.4	0.1	0	4.3	5.0	5.0
2	5.1	0	0	0	1.5	0.9	0.9	1.8	0	0	5.0	0	2.7	2.0	2.2	2.5
3	0.4	0	5.4	5.4	1.1	1.8	0.9	1.8	1.9	0	0	0.2	2.1	2.0	1.9	1.8
4	0.2	0	5.4		0	1.8	5.4	5.4	8.8	0	0.1	0	0	0	0	0
5	0	0.1	0		3.1	1.8	1.9	0	0.9	5.0	0	0	0	2.5	0	0
6	0	0	0		0	0	1.9	1.6	0.9	0	0.2	0	2.3	2.5		
7	0	0	5.4		0	0	1.9	1.6	1.0	0	0	0	0	4.2		
8	0	0	0		5.0	0	1.8	1.8	1.7	0	0	0	5.4	8.8		
9	0	5.4	5.3			2.6	1.8	0	1.7	5.0	0	0				
10	0	5.0	5.0			2.5	0	1.8	1.7	4.8	5.0	0				
11	0.6	5.0	5.0			4.9	1.8	0	0	4.8	3.1	0				
12	0	0.2	5.0			1.8	1.8	1.8	1.8	0	0	0				
13	0	0.1	5.0			0.1	1.8	1.8	1.8	1.8	0	5.4				
14	0	5.0	5.3			1.8		1.8	0	1.8	5.4	0				
15	5.1	4.9	5.0			0				1.8		0				
16	0	5.0	5.0			0				5.4		5.4				
17	5.0															
18	0															
19	4.9															
20	5.0															
21	5.0															
22	5.0															
23	4.8															
24	5.1															

	IC10		IC10
Pin 1	0	Pin 1	0.1
2	5.1	2	0.1
3	3.5	3	5.0
4	3.6	4	5.0
5	1.7	5	4.9
6	0	6	5.0
7	2.2	7	0.1
8	2.1	8	0
9	5.1	9	5.1
10	5.1	10	0
11	4.6	11	0
12	5.4	12	0
13	-0.1	13	4.9
14	0	14	2.5
15	5.1	15	2.4
16	0.1	16	5.0
17	5.0	17	5.0
18	0	18	5.0
19	0	19	4.9
20	5.0	20	5.0
21	0	21	5.1
22	0	22	5.3
23	5.1	23	5.3
24	0.2	24	5.4
25	5.0	25	5.4
26	0.1	26	0
27	0.1	27	5.4
28	4.80	28	5.4
29	0	29	5.4
30	0	30	0
31	0	31	5.4
32	0	32	0

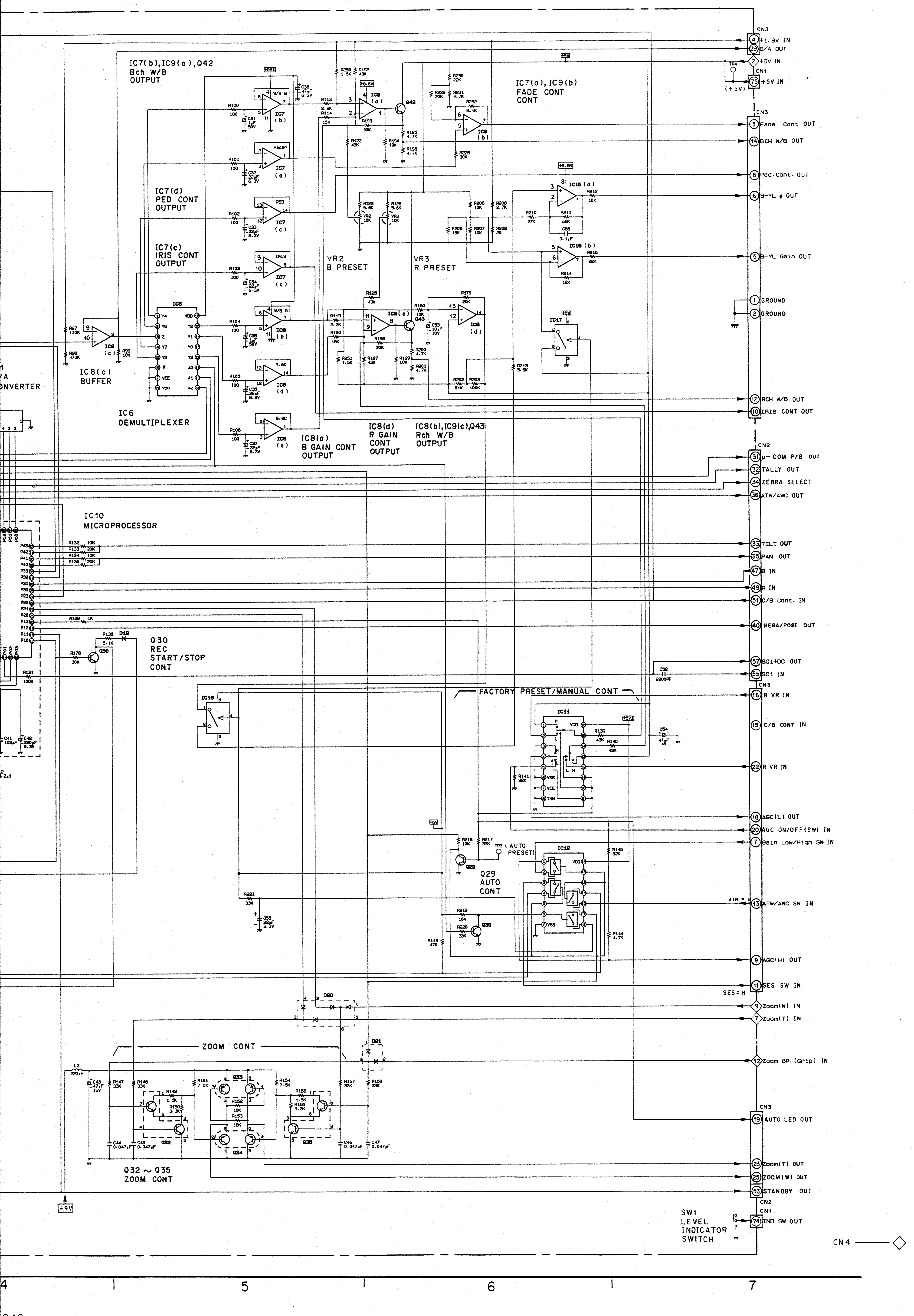
	Pin 1	2	3	4	5	6
Q 32	0	0	8.8	8.8	1.5	8.8
33	8.4	8.4	8.4	8.4	8.8	8.8
34	0	8.8	0	8.8	8.4	8.4
35	0	0	8.8	8.8	0	8.8

	B	C	E
Q 1	0	5.4	0
2	4.8	0	5.4
3	0	2.6	0
4	0	4.8	0
5	2.5	4.5	1.8
6	4.4	5.1	5.1
7	3.1	5.2	2.7
8	0	5.4	0
9	0	5.3	0
10	0	0	0.1
11	0	5.4	0.1
12	1.7	0	1.0
13	2.7	5.4	2.1
14	0	5.4	0
15	1.7	2.7	1.0
16	2.7	5.4	0
17	0	5.4	0
18	5.4	0	0
19	0	0	0
20	0	4.6	0
21	5.4	5.4	5.1
22	5.7	13.9	5.1
23	5.1	0	5.7
24	1.9	1.5	1.4
25	0	1.5	0
26	0.7	0	0
27	0.5	0	0
28	0	5.1	0
29	0.6	0	0
30	0.6	0	0
36	0	0	0
37	0	0	0
38	2.7	5.4	2.2
39	0.6	0.1	0
41	0	5.0	0
42	2.7	5.0	2.0
43	1.8	5.0	1.3
44	0	3.9	0
45	0.6	0	0

SCHEMATIC DIAGRAM OF MICRO


MICROPROCESSOR BOARD
CN3
EVF CHARA OUT 26
C/B. L/V SELECT IN/OUT (To 32pin) 17
C/B=L
RET CONT IN 21
AF AREA IN 24
CN2
VIDEO CHARC OUT 46
STANDBY SW IN 61
ON=H
ST=L
HD IN 48
VP IN 60
P91 1
P92 3
P93 5
PA0 10
PA1 8
PA2 6
PA3 4
CN2
AUTO PRESET IN 58
VTR P/B IN 52
B/W FADE OUT 59
B/W FADE IN 13
CN2
AWC SET IN 45
REC S/S IN 37
LOW LIGHT IN 56
ATW LOW IN 39
RCU INF IN 50
C/B SELECT IN 43
SES CONT IN 41
AF S. CLOCK OUT 44
AF S. DATA OUT 42
CN1
C/R S.CLOCK IN/OUT 76
C/R S. DATA IN/OUT 78
S. CLOCK IN 65
S. DATA IN 69
32PIN S. CLOCK IN 63
R75 10
S. CLOCK OUT 67
+12V IN 73
32PIN S. DATA IN 71
R76 10
CN2
VTR S.DATA OUT 30
VTR S. DATA OUT 28
VTR S.DATA IN 38
CN3
+5VII (+5.4V) IN 62
VTR S.CLOCK OUT 66
RET AUDIO-ST IN/OUT 70
RET AUDIO OUT 79
+1.5V IN 77
GROUND 83
GROUND 84
GROUND 11
CN2
+9V IN 27
+9V
10PIN/14PIN SELECT IN 54
VTR S.CLOCK IN 81
VTR WAR IN 68
10PIN/14PIN SELECT IN 64
VTR REC S/S OUT 80
CN1
Q3 LINE VIEW CONT
Q4, Q5 AF AREA AMP
IC1
VR1 CHARACTER SIZE
Q6 CHARACTER GEN ON/OFF CONT
IC1 CHARACTER GENERATOR
Q1 Vp INVERTER
Q2 STANDBY CONT
Z1 D/A CONVERTER
INPUT MATRIX
IC3
JAP/AME SELECT
PLAY BACK
10P/14P
AWC(L) /ATW(H)
PAL/NTSC
PAL Only
NTSC Only
RUN SELECT
AUTO
LOW LIGHT
BATT
RCU
ALARM
TP2 (AWC SET)
IC2
REC
AWC SET
ATW LOW LIGHT
BACK UP
C/L BAR VIDEO
SES
IC10
SERIAL CLOCK AMP
Q12~Q14 SERIAL CLOCK AMP
Q19 SERIAL DATA OUT
Q20, Q21 SERIAL CLOCK AMP
SERIAL DATA AMP
Q18 RUN CONT
CT1 TIME FREQ
TP1 (TIME FREQ)
IC4
BACK UP VOLTAGE GENERATOR
T1 Bottom View
IC5 (a)
IC5 (b)
IC5(b) BATTERY WARNING DETECTION
VTR ALARM INPUT
IC13
R252 47K
R253 47K
R254 470
IC14 (a)
IC14 (b)
T1, Q24~Q28 BACK UP VOLTAGE GENERATOR
IC5(a) BACK UP BATTERY WARNING DETECTION
IC14(b) STANDBY CONT
IC13, IC14(a), Q37, Q38 VTR ALARM INPUT
Q36 VTR 14Pin/10Pin CONT
R216 4.7K
E
D
C
B
A
1
2
3
4

MICROPROCESSOR BOARD


IC7(b),IC9(a),Q42
Bch W/B
OUTPUT
IC7(a), IC9(b)
FADE CONT
CONT
IC7(d)
PED CONT
OUTPUT
IC7(c)
IRIS CONT
OUTPUT
VR2
B PRESET
VR3
R PRESET
IC8(c)
BUFFER
IC6
DEMULTIPLEXER
IC8(a)
B GAIN CONT
OUTPUT
IC8(d)
R GAIN
CONT
OUTPUT
IC8(b),IC9(c),Q43
Rch W/B
OUTPUT
IC10
MICROPROCESSOR
Q30
REC
START/STOP
CONT
FACTORY PRESET/MANUAL CONT
Q29
AUTO
CONT
TP3 (AUTO PRESET)
ZOOM CONT
Q32 ~ Q35
ZOOM CONT
SW1
LEVEL
INDICATOR
SWITCH
CN3
CN1
CN2
4 +1.8V IN
29 D/A OUT
2 +5V IN
75 +5V IN
(+5V)
TP4
3 Fade Cont OUT
14 BCH W/B OUT
8 Ped.Cont. OUT
6 B-YL ϕ OUT
5 B-YL Gain OUT
1 GROUND
2 GROUND
12 RCH W/B OUT
10 IRIS CONT OUT
31 μ-COM P/B OUT
32 TALLY OUT
34 ZEBRA SELECT
36 ATW/AWC OUT
33 TILT OUT
35 PAN OUT
47 B IN
49 R IN
51 C/B Cont. IN
40 NEGA/POSI OUT
57 SC1+DC OUT
55 SC1 IN
16 B VR IN
15 C/B CONT IN
22 R VR IN
18 AGC(L) OUT
20 AGC ON/OFF (SW) IN
7 Gain Low/High SW IN
ATW = H
13 ATW/AWC SW IN
9 AGC(H) OUT
SES = H
11 SES SW IN
9 Zoom(W) IN
7 Zoom(T) IN
12 Zoom 8P.(Grip) IN
19 AUTO LED OUT
23 Zoom(T) OUT
25 ZOOM(W) OUT
53 STANDBY OUT
74 IND SW OUT
CN4
+9V
+5V
+8.6V
D/A
CONVERTER
4
5
6
7

<Index>

IC1	E3
IC2	C3
IC3	D3
IC4	B2
IC5	B3
IC6	D5
IC7	E5
IC8	D5
IC9	E6
IC10	C4
IC11	C6
IC12	B6
IC13	A1
IC14	A2
IC15	E6
IC16	C5
IC17	D6
Q1	D2
Q2	D2
Q3	E3
Q4	E3
Q5	E3
Q6	E3
Q7	D2
Q8	C2
Q9	D3
Q10	D3
Q11	C3
Q12	C2
Q13	C2
Q14	C2
Q15	B2
Q16	B2
Q17	B2
Q18	B2
Q19	B3
Q20	B3
Q21	B3
Q22	B2
Q23	B2
Q24	A2
Q25	A2
Q26	A2
Q27	A3
Q28	B3
Q29	B6
Q30	C4
Q32	A5
Q33	A5
Q34	A5
Q35	A5
Q36	A3
Q37	A2
Q38	A2
Q39	B6
Q42	E6
Q43	D6
D1	E1
D2	E1
D3	D2
D4	C2
D5	D3
D6	D3
D7	C3
D8	C1
D9	B3
D10	B3
D11	B3
D12	B3
D16	B2
D17	B2
D18	B2
D19	C5
D20	B5
D21	A6

CONDUCTOR VIEW

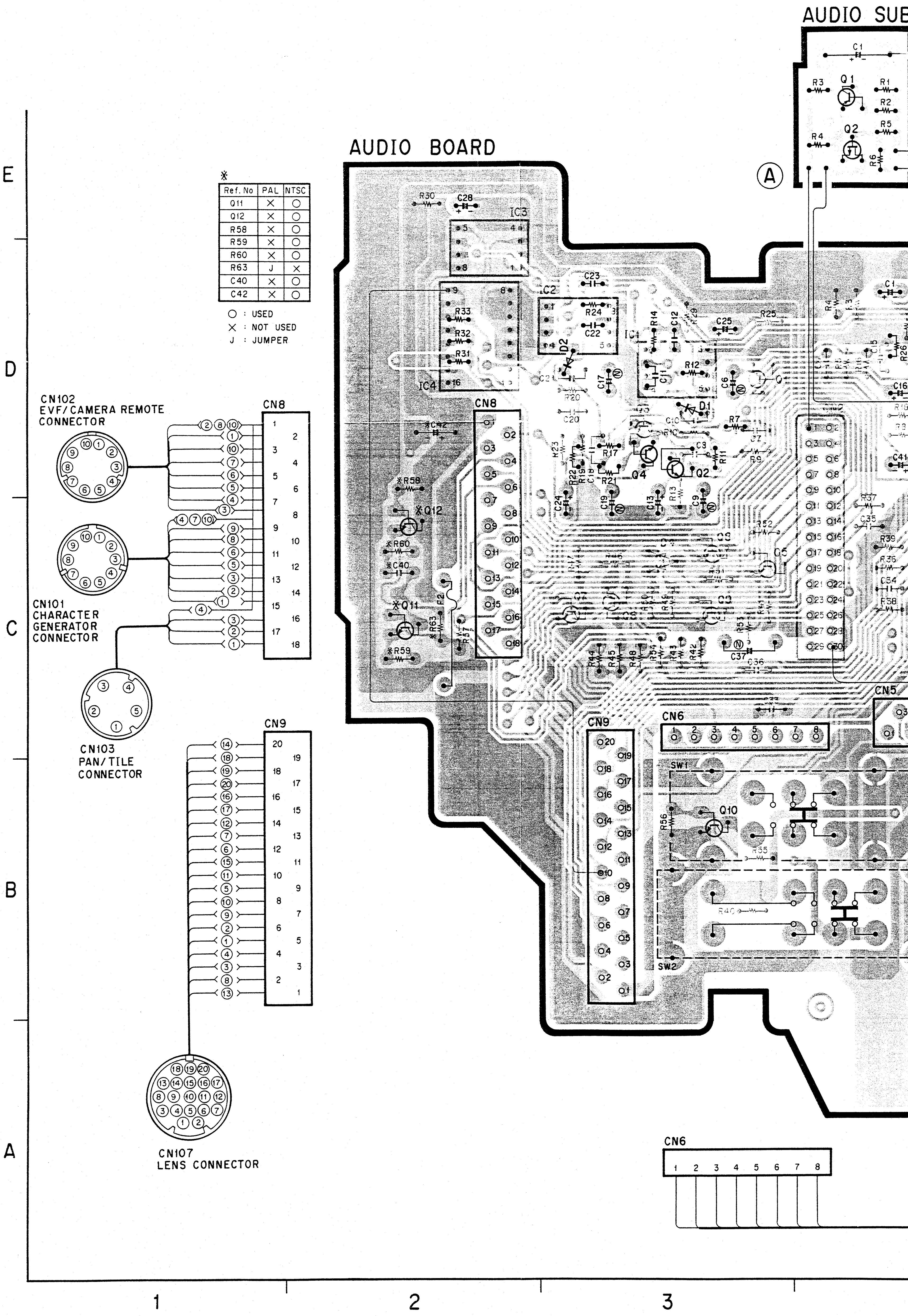
<Index>

IC1	D3
IC2	D3
IC3	D2
IC4	D2
Q1	D3
Q2	D3
Q3	D3
Q4	D3
Q5	C3
Q6	C3
Q7	C3
Q8	C3
Q9	C3
Q10	B3
D1	D3
D2	D3
D3	C5
D4	C3

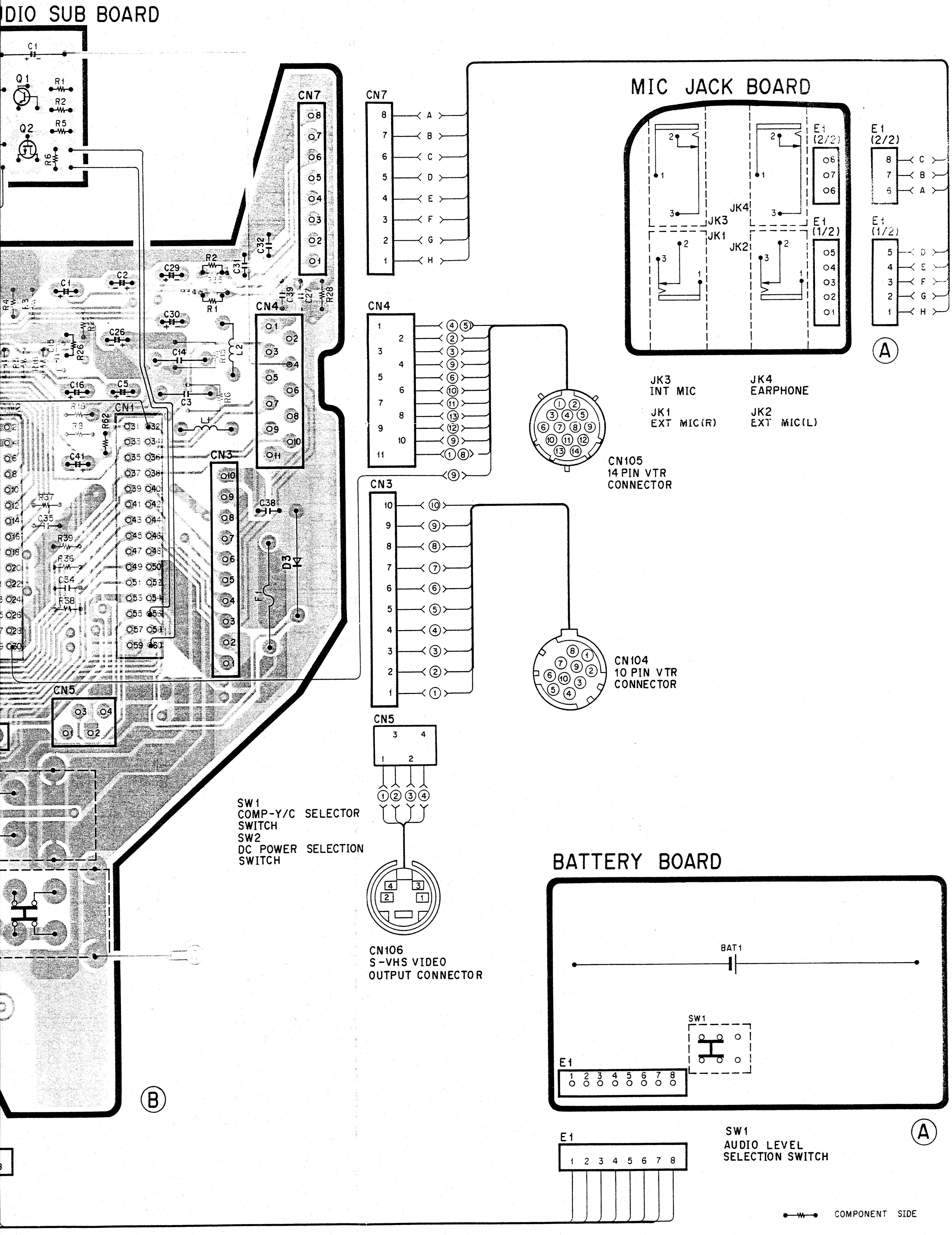
※

Ref. No	PAL	NTSC
Q11	×	○
Q12	×	○
R58	×	○
R59	×	○
R60	×	○
R63	J	×
C40	×	○
C42	×	○

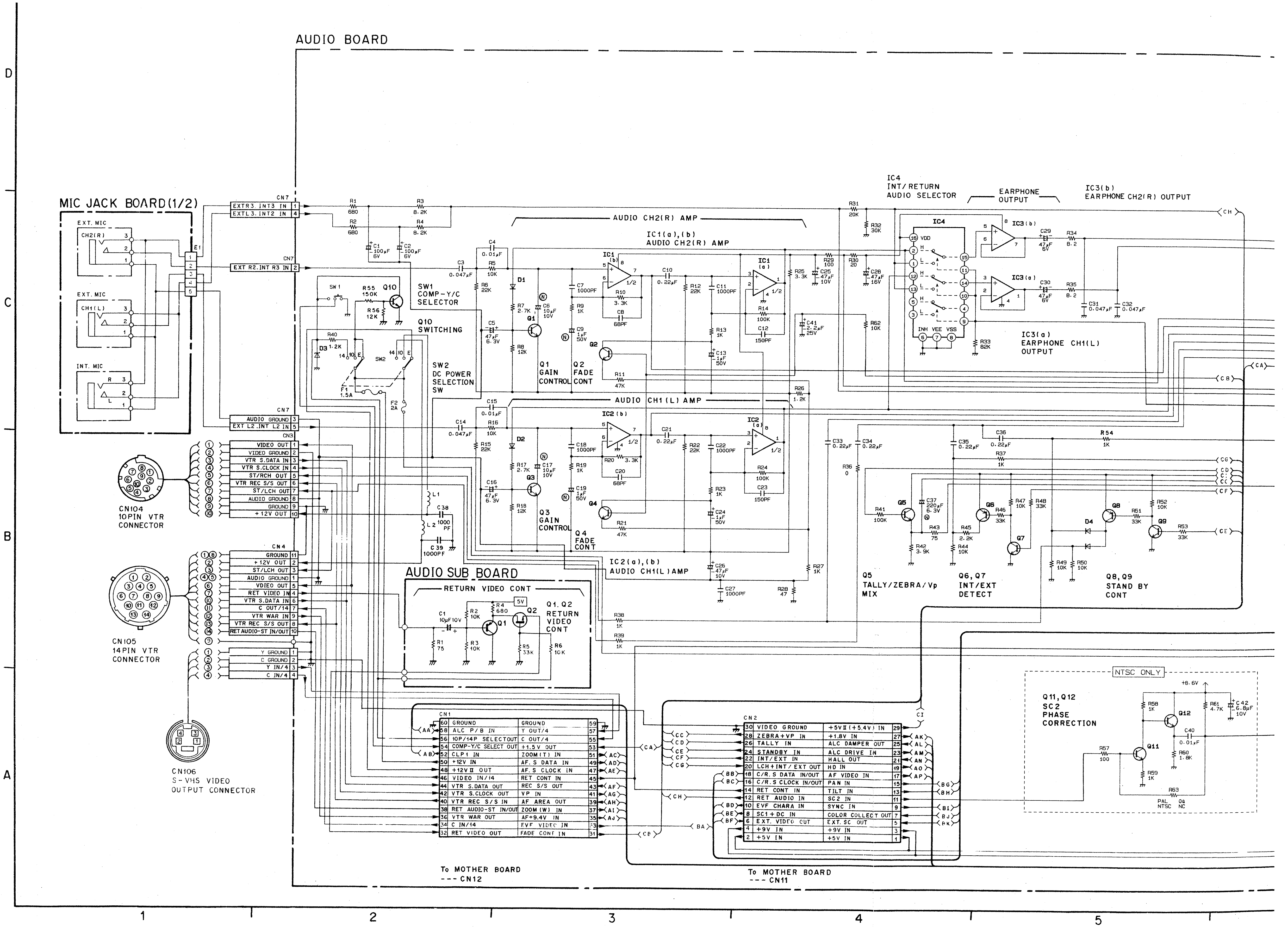
○ : USED
× : NOT USED
J : JUMPER


AUDIO BOARD
AUDIO SUB
Ⓐ
E
D
C
B
A
1
2
3
CN102
EVF/CAMERA REMOTE
CONNECTOR
CN101
CHARACTER
GENERATOR
CONNECTOR
CN103
PAN/TILE
CONNECTOR
CN107
LENS CONNECTOR
CN8
CN9
CN6
CN5
IC1
IC2
IC3
IC4
Q1
Q2
Q4
Q10
※Q11
※Q12
D1
D2
SW1
SW2
※R58
※R59
※R60
※R63
※C40
※C42
R1
R2
R3
R4
R5
R6
R7
R9
R12
R14
R17
R21
R24
R25
R30
R31
R32
R33
R35
R39
R40
R42
R43
R44
R45
R48
R52
R53
R55
R56
C1
C3
C6
C9
C13
C17
C19
C20
C22
C23
C24
C25
C28
C35
C37
C41
C54
1 2 3 4 5 6 7 8

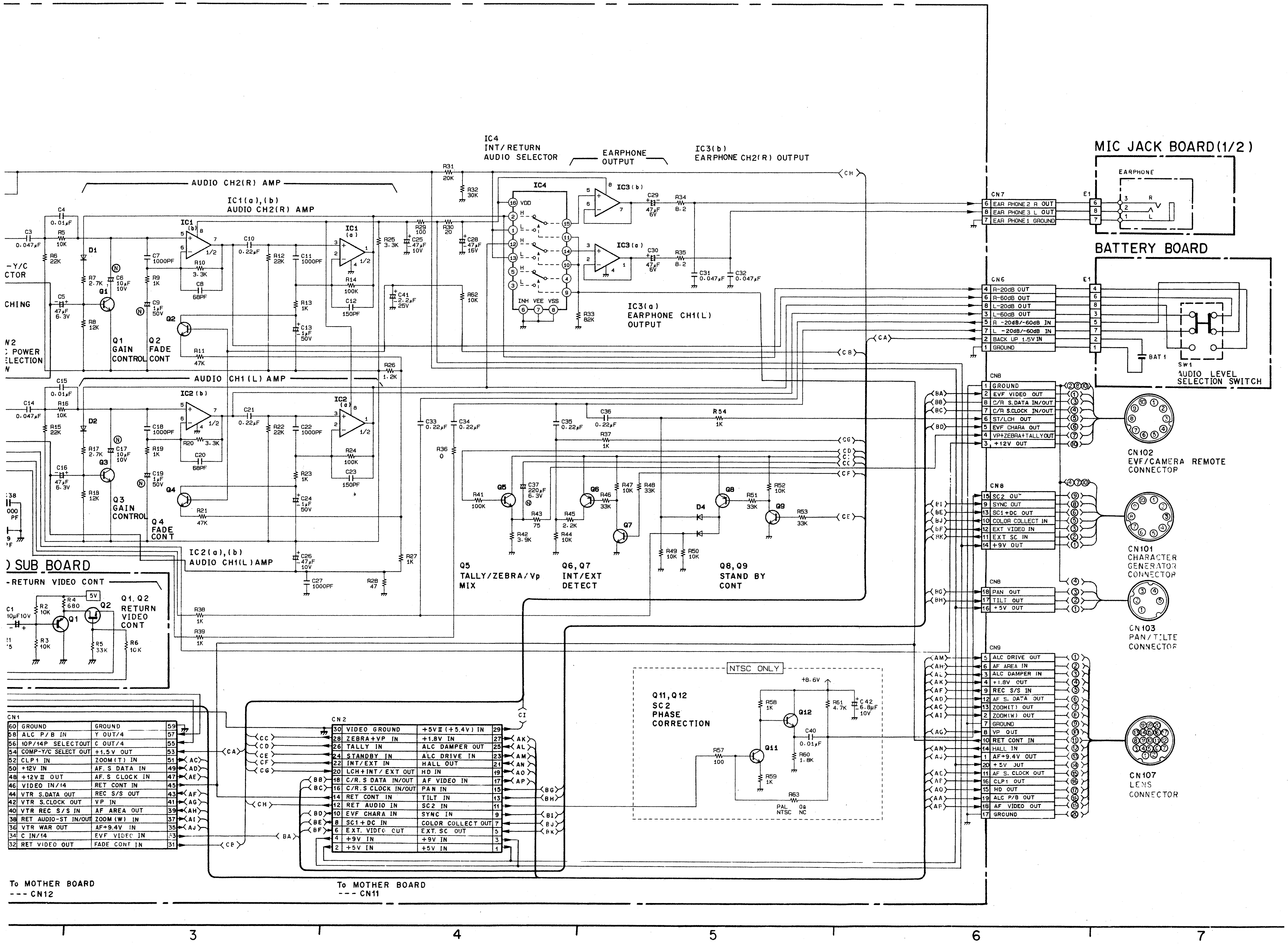
R VIEW OF AUDIO BOARD


DIO SUB BOARD
MIC JACK BOARD
JK3 INT MIC
JK4 EARPHONE
JK1 EXT MIC(R)
JK2 EXT MIC(L)
E1 (2/2)
E1 (1/2)
CN7
CN4
CN3
CN5
CN1
CN105 14 PIN VTR CONNECTOR
CN104 10 PIN VTR CONNECTOR
CN106 S-VHS VIDEO OUTPUT CONNECTOR
SW1 COMP-Y/C SELECTOR SWITCH
SW2 DC POWER SELECTION SWITCH
BATTERY BOARD
BAT1
SW1
E1
SW1 AUDIO LEVEL SELECTION SWITCH
COMPONENT SIDE
Ⓐ
Ⓑ

SCHEMATIC DIAGRAM OF AUDIO BOARD


AUDIO BOARD
MIC JACK BOARD(1/2)
EXT. MIC
CH2(R)
EXT. MIC
CH1(L)
INT. MIC
E1
CN7
EXTR3. INT3 IN 1
EXTL3. INT2 IN 4
EXT R2. INT R3 IN 2
AUDIO GROUND 3
EXT L2. INT L2 IN 5
CN3
VIDEO OUT 1
VIDEO GROUND 2
VTR S.DATA IN 3
VTR S.CLOCK IN 4
ST/RCH OUT 5
VTR REC S/S OUT 6
ST/LCH OUT 7
AUDIO GROUND 8
GROUND 9
+12V OUT 10
CN104
10PIN VTR
CONNECTOR
CN4
GROUND 11
+12V OUT 2
ST/LCH OUT 3
AUDIO GROUND 1
VDIEO OUT 5
RET VIDEO IN 4
VTR S.DATA IN 6
C OUT/14 7
VTR WAR IN 9
VTR REC S/S OUT 8
RET AUDIO-ST IN/OUT 10
Y GROUND 1
C GROUND 2
Y IN/4 3
C IN/4 4
CN105
14PIN VTR
CONNECTOR
CN106
S-VHS VIDEO
OUTPUT CONNECTOR
SW1
R55 150K
Q10
R56 12K
SW1
COMP-Y/C
SELECTOR
Q10
SWITCHING
R40 1.2K
D3
SW2
F1 1.5A
F2 2A
SW2
DC POWER
SELECTION
SW
L1
C38 1000 PF
L2
C39 1000PF
AUDIO SUB BOARD
RETURN VIDEO CONT
C1 10μF10V
R1 75
R2 10K
R3 10K
R4 680
5V
Q1
Q2
R5 33K
R6 10K
Q1, Q2
RETURN
VIDEO
CONT
R1 680
R2 680
R3 8.2K
R4 8.2K
C1 100μF 6V
C2 100μF 6V
C3 0.047μF
C4 0.01μF
R5 10K
R6 22K
C5 47μF 6.3V
D1
R7 2.7K
C6 10μF 10V
Q1
R8 12K
Q1
GAIN
CONTROL
Q2
FADE
CONT
C7 1000PF
R9 1K
C9 1μF 50V
Q2
R11 47K
AUDIO CH2(R) AMP
IC1(a),(b)
AUDIO CH2(R) AMP
IC1 (b)
1/2
R10 3.3K
C8 68PF
C10 0.22μF
R12 22K
C11 1000PF
R13 1K
C13 1μF 50V
IC1 (a)
1/2
R14 100K
C12 150PF
R25 3.3K
C25 47μF 10V
R29 100
C41 2.2μF 25V
R26 1.2K
AUDIO CH1(L) AMP
C15 0.01μF
C14 0.047μF
R16 10K
R15 22K
D2
R17 2.7K
C17 10μF 10V
Q3
C16 47μF 6.3V
R18 12K
Q3
GAIN
CONTROL
C18 1000PF
R19 1K
C19 1μF 50V
Q4
R21 47K
Q4
FADE
CONT
IC2(b)
1/2
R20 3.3K
C20 68PF
C21 0.22μF
R22 22K
C22 1000PF
R23 1K
C24 1μF 50V
IC2 (a)
1/2
R24 100K
C23 150PF
IC2(a),(b)
AUDIO CH1(L) AMP
C26 47μF 10V
C27 1000PF
R27 1K
R28 47
R38 1K
R39 1K
R31 20K
R32 30K
R30 20
C28 47μF 16V
R62 10K
IC4
INT/RETURN
AUDIO SELECTOR
IC4
VDD
INH VEE VSS
R33 82K
EARPHONE
OUTPUT
IC3(b)
EARPHONE CH2(R) OUTPUT
IC3(b)
C29 47μF 6V
R34 8.2
IC3(a)
C30 47μF 6V
R35 8.2
C31 0.047μF
C32 0.047μF
IC3(a)
EARPHONE CH1(L)
OUTPUT
C33 0.22μF
C34 0.22μF
R36 0
C35 0.22μF
C36 0.22μF
R37 1K
R54 1K
Q5
R41 100K
C37 220μF 6.3V
R42 3.9K
R43 75
Q6
R45 2.2K
R44 10K
R46 33K
R47 10K
R48 33K
Q7
Q5
TALLY/ZEBRA/Vp
MIX
Q6, Q7
INT/EXT
DETECT
D4
R49 10K
R50 10K
Q8
R51 33K
R52 10K
Q9
R53 33K
Q8, Q9
STAND BY
CONT
CH
CA
CB
CG
CD
CC
CF
CE
CI
NTSC ONLY
+6.6V
Q11, Q12
SC2
PHASE
CORRECTION
R58 1K
Q12
R61 4.7K
C42 6.8μF 10V
C40 0.01μF
R57 100
Q11
R60 1.8K
R59 1K
R63
PAL 0Ω
NTSC NC
CN1
60 GROUND
59 GROUND
58 ALC P/B IN
57 Y OUT/4
56 10P/14P SELECTOUT
55 C OUT/4
54 COMP-Y/C SELECT OUT
53 +1.5V OUT
52 CLP1 IN
51 ZOOM(T) IN
50 +12V IN
49 AF. S DATA IN
48 +12V Ⅱ OUT
47 AF. S CLOCK IN
46 VIDEO IN/14
45 RET CONT IN
44 VTR S.DATA OUT
43 REC S/S OUT
42 VTR S.CLOCK OUT
41 VP IN
40 VTR REC S/S IN
39 AF AREA OUT
38 RET AUDIO-ST IN/OUT
37 ZOOM(W) IN
36 VTR WAR OUT
35 AF+9.4V IN
34 C IN/14
33 EVF VIDEO IN
32 RET VIDEO OUT
31 FADE CONT IN
AA
AB
AC
AD
AE
AF
AG
AH
AI
AJ
To MOTHER BOARD
--- CN12
CN2
30 VIDEO GROUND
29 +5VⅡ(+5.4V) IN
28 ZEBRA+VP IN
27 +1.8V IN
26 TALLY IN
25 ALC DAMPER OUT
24 STANDBY IN
23 ALC DRIVE IN
22 INT/EXT IN
21 HALL OUT
20 LCH+INT/EXT OUT
19 HD IN
18 C/R.S DATA IN/OUT
17 AF VIDEO IN
16 C/R.S CLOCK IN/OUT
15 PAN IN
14 RET CONT IN
13 TILT IN
12 RET AUDIO IN
11 SC2 IN
10 EVF CHARA IN
9 SYNC IN
8 SC1+DC IN
7 COLOR COLLECT OUT
6 EXT. VIDEO OUT
5 EXT. SC OUT
4 +9V IN
3 +9V IN
2 +5V IN
1 +5V IN
AK
AL
AM
AN
AO
AP
BA
BB
BC
BD
BE
BF
BG
BH
BI
BJ
BK
To MOTHER BOARD
--- CN11
D
C
B
A
1
2
3
4
5

SCHEMATIC DIAGRAM OF AUDIO BOARD


AUDIO CH2(R) AMP
IC1(a),(b)
AUDIO CH2(R) AMP
AUDIO CH1(L) AMP
IC2(a),(b)
AUDIO CH1(L) AMP
IC4
INT/RETURN
AUDIO SELECTOR
EARPHONE
OUTPUT
IC3(b)
EARPHONE CH2(R) OUTPUT
IC3(a)
EARPHONE CH1(L)
OUTPUT
Q1
GAIN
CONTROL
Q2
FADE
CONT
Q3
GAIN
CONTROL
Q4
FADE
CONT
Q5
TALLY/ZEBRA/Vp
MIX
Q6,Q7
INT/EXT
DETECT
Q8,Q9
STAND BY
CONT
NTSC ONLY
Q11,Q12
SC2
PHASE
CORRECTION
SUB BOARD
RETURN VIDEO CONT
Q1.Q2
RETURN
VIDEO
CONT
MIC JACK BOARD(1/2)
EARPHONE
BATTERY BOARD
BAT1
SW1
AUDIO LEVEL
SELECTION SWITCH
CN7
CN6
CN8
CN9
CN1
CN2
CN102
EVF/CAMERA REMOTE
CONNECTOR
CN101
CHARACTER
GENERATOR
CONNECTOR
CN103
PAN/TILTE
CONNECTOR
CN107
LENS
CONNECTOR
To MOTHER BOARD
--- CN12
To MOTHER BOARD
--- CN11
3
4
5
6
7

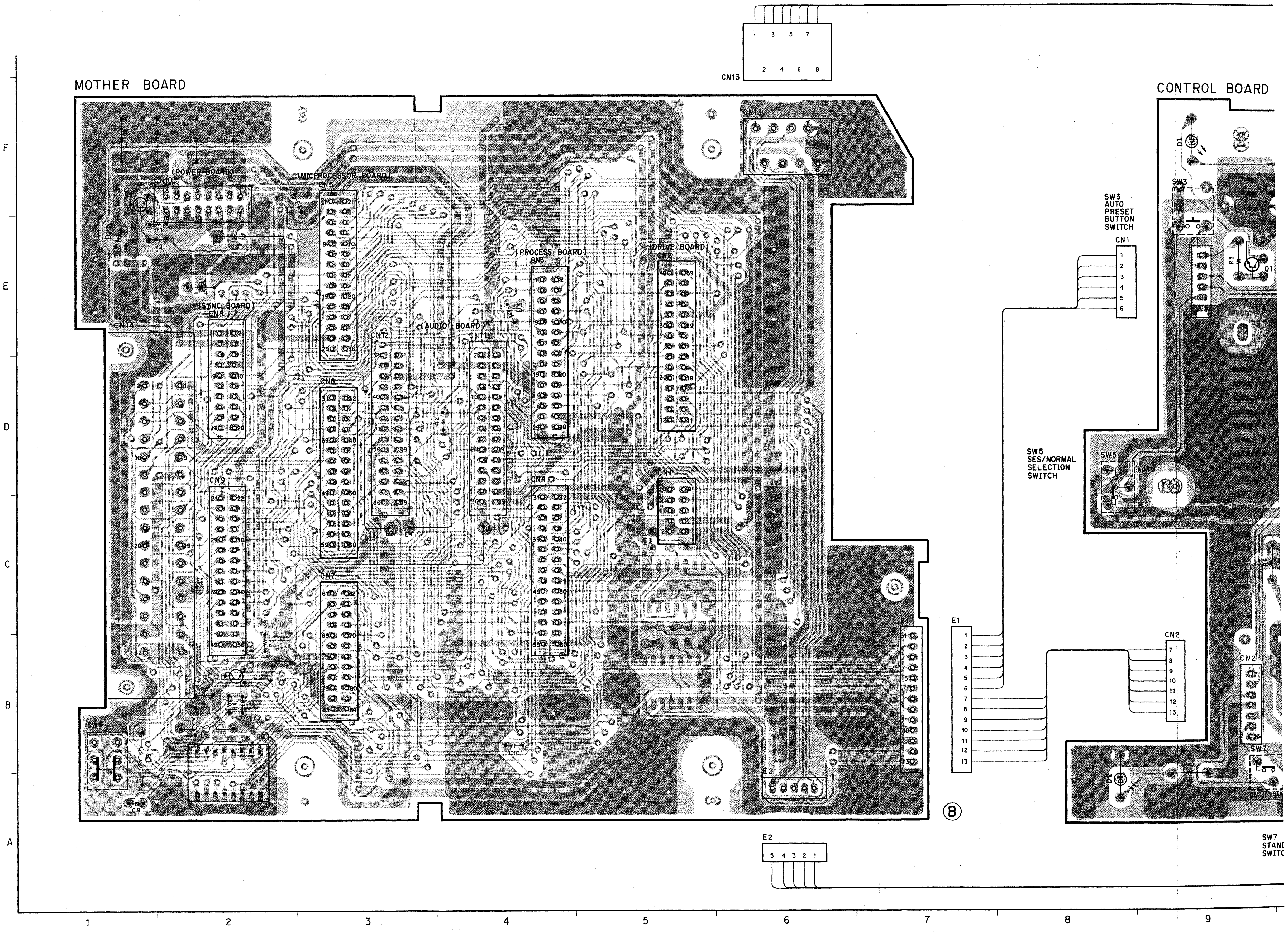
<Index>

IC1	C4
IC2	B4
IC3	C5
IC4	C4
Q1	C3
Q2	C3
Q3	B3
Q4	B3
Q5	B4
Q6	B5
Q7	B5
Q8	B5
Q9	B5
Q10	C2
D1	C3
D2	B3
D3	C2
D4	B5

CONDUCTOR VIEW OF MOTHER BOARD

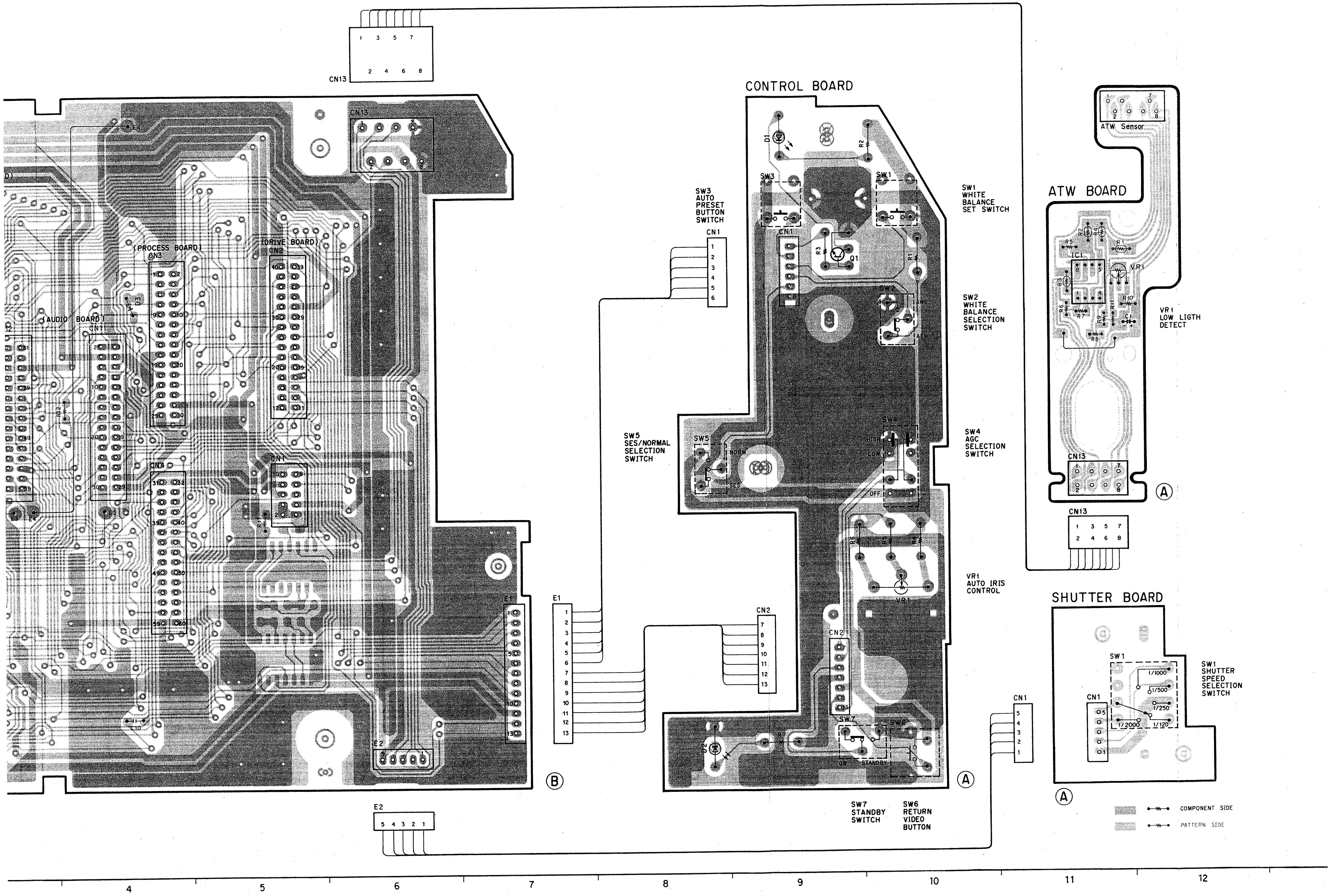
<Index>

IC1	A2
Q1	F1
Q2	B2
D1	F3
D2	E1
D3	E4

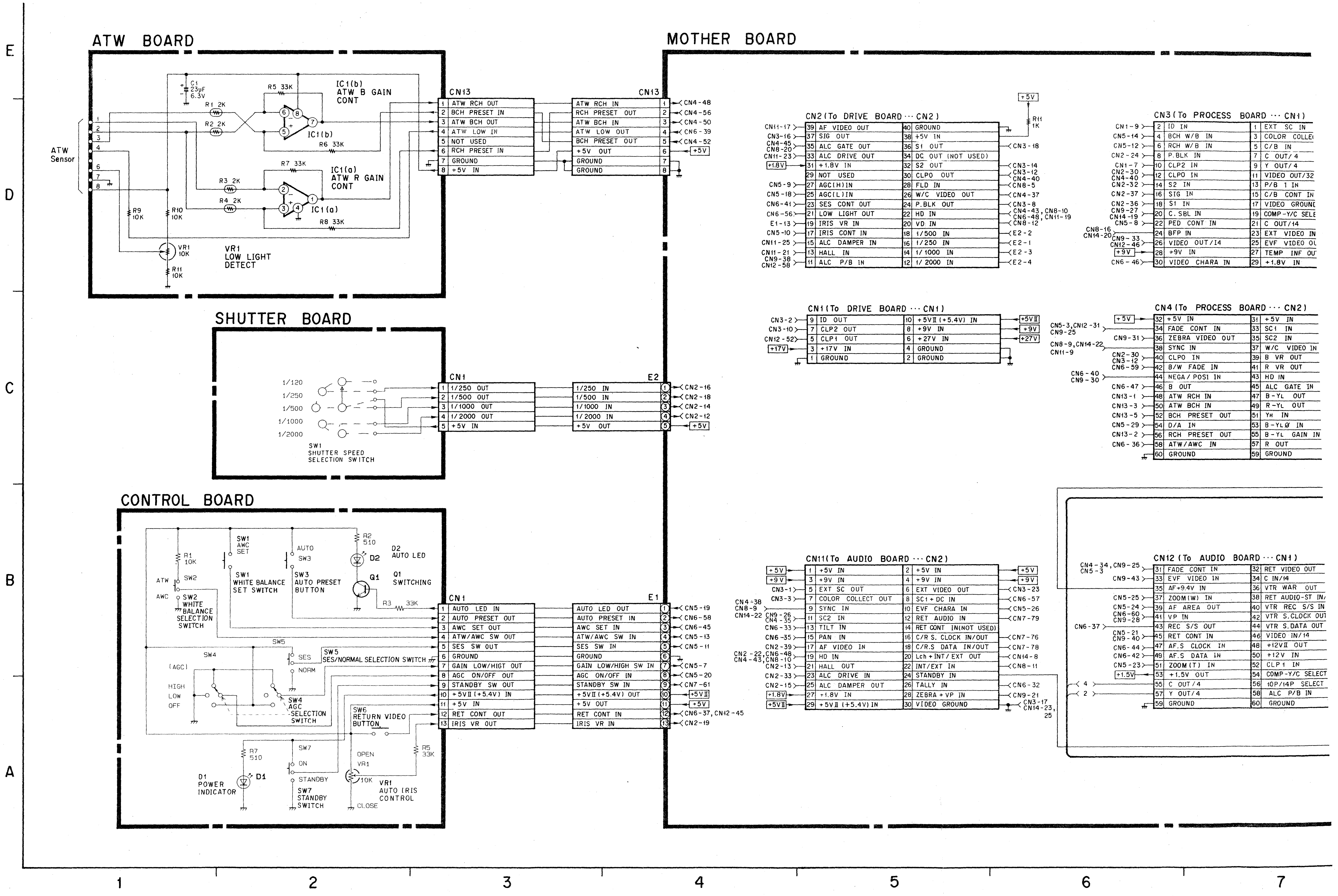


MOTHER BOARD
CONTROL BOARD
CN13
(POWER BOARD)
CN10
(MICPROCESSOR BOARD)
CN5
(SYNC BOARD)
CN8
CN14
CN12
(AUDIO BOARD)
CN11
(PROCESS BOARD)
CN3
(DRIVE BOARD)
CN2
CN6
CN9
CN7
CN4
CN1
E1
E2
E3
E4
SW1
IC1
Q1
Q2
D1
D2
D3
R1
R2
R3
R4
C4
C9
C10
SW3
AUTO
PRESET
BUTTON
SWITCH
SW5
SES/NORMAL
SELECTION
SWITCH
NORM
SES
SW7
STAND
SWITC
ON
Ⓑ
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9

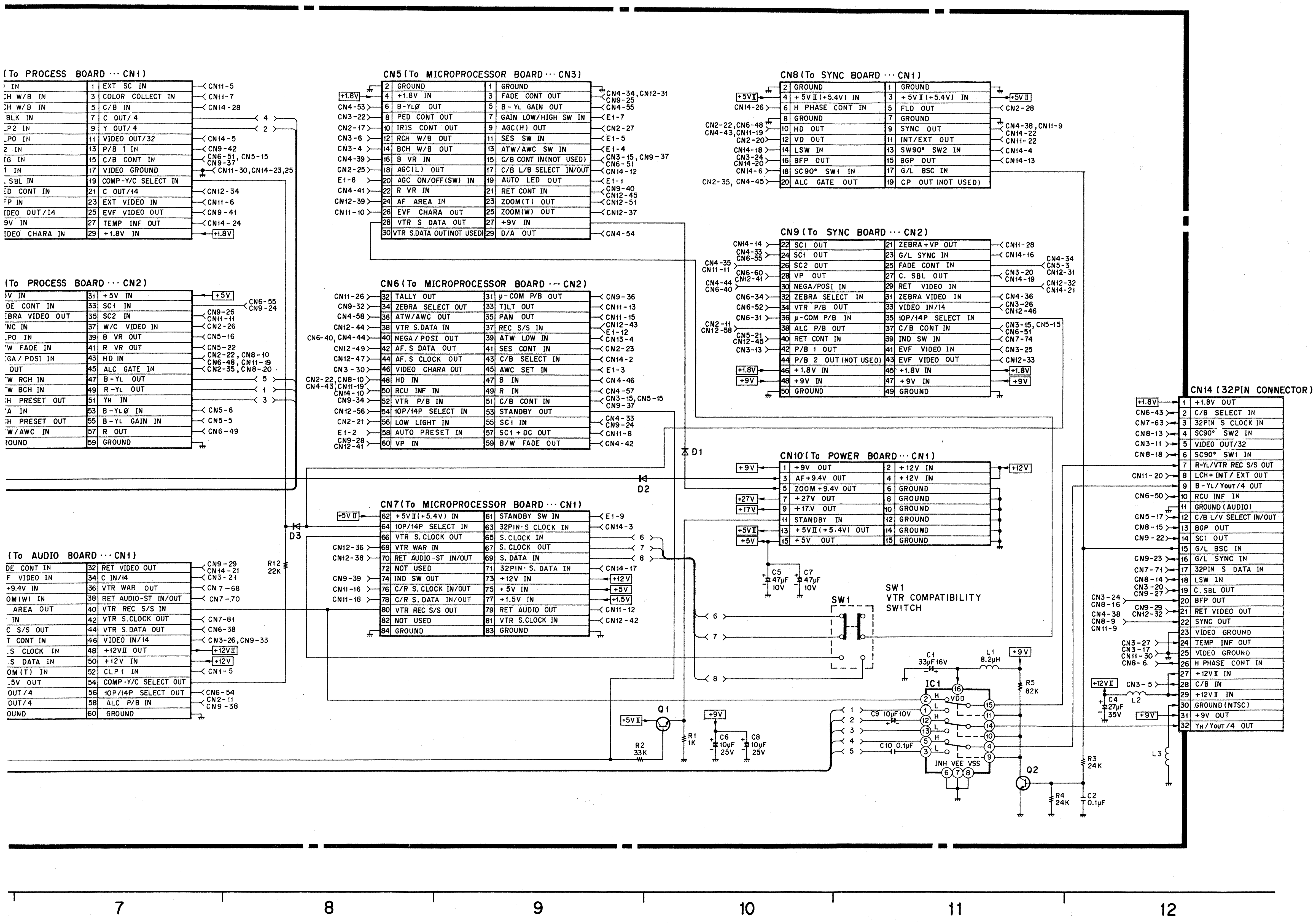
CONDUCTOR VIEW OF MOTHER BOARD


CN13
1 3 5 7
2 4 6 8
(PROCESS BOARD)
CN3
(DRIVE BOARD)
CN2
(AUDIO BOARD)
CN11
CN4
CN1
E1
E2
5 4 3 2 1
Ⓑ
CONTROL BOARD
SW3
AUTO
PRESET
BUTTON
SWITCH
SW1
WHITE
BALANCE
SET SWITCH
SW2
WHITE
BALANCE
SELECTION
SWITCH
SW4
AGC
SELECTION
SWITCH
SW5
SES/NORMAL
SELECTION
SWITCH
VR1
AUTO IRIS
CONTROL
SW7
STANDBY
SWITCH
SW6
RETURN
VIDEO
BUTTON
CN1
CN2
D1
D2
Q1
R1
R2
R3
R6
R7
Ⓐ
ATW BOARD
ATW Sensor
IC1
VR1
LOW LIGTH
DETECT
Ⓐ
SHUTTER BOARD
SW1
SHUTTER
SPEED
SELECTION
SWITCH
1/1000
1/500
1/250
1/2000
1/120
Ⓐ
COMPONENT SIDE
PATTERN SIDE
4
5
6
7
8
9
10
11
12

SCHEMATIC DIAGRAM OF MO1


ATW BOARD
ATW Sensor
IC1(b) ATW B GAIN CONT
IC1(a) ATW R GAIN CONT
VR1 LOW LIGHT DETECT
CN13
SHUTTER BOARD
SW1 SHUTTER SPEED SELECTION SWITCH
1/120
1/250
1/500
1/1000
1/2000
CN1
E2
CONTROL BOARD
SW1 WHITE BALANCE SET SWITCH
SW2 WHITE BALANCE SELECTION SWITCH
SW3 AUTO PRESET BUTTON
Q1 SWITCHING
D2 AUTO LED
SW4 AGC SELECTION SWITCH
SW5 SES/NORMAL SELECTION SWITCH
SW6 RETURN VIDEO BUTTON
SW7 STANDBY SWITCH
D1 POWER INDICATOR
VR1 AUTO IRIS CONTROL
E1
MOTHER BOARD
CN2 (To DRIVE BOARD ··· CN2)
CN3 (To PROCESS BOARD ··· CN1)
CN1 (To DRIVE BOARD ··· CN1)
CN4 (To PROCESS BOARD ··· CN2)
CN11 (To AUDIO BOARD ··· CN2)
CN12 (To AUDIO BOARD ··· CN1)
E
D
C
B
A
1
2
3
4
5
6
7

RAM OF MOTHER BOARD


(To PROCESS BOARD ··· CN1)
1 EXT SC IN
3 COLOR COLLECT IN
5 C/B IN
7 C OUT/4
9 Y OUT/4
11 VIDEO OUT/32
13 P/B 1 IN
15 C/B CONT IN
17 VIDEO GROUND
19 COMP-Y/C SELECT IN
21 C OUT/14
23 EXT VIDEO IN
25 EVF VIDEO OUT
27 TEMP INF OUT
29 +1.8V IN
(To PROCESS BOARD ··· CN2)
31 +5V IN
33 SC1 IN
35 SC2 IN
37 W/C VIDEO IN
39 B VR OUT
41 R VR OUT
43 HD IN
45 ALC GATE IN
47 B-YL OUT
49 R-YL OUT
51 YH IN
53 B-YLØ IN
55 B-YL GAIN IN
57 R OUT
59 GROUND
(To AUDIO BOARD ··· CN1)
32 RET VIDEO OUT
34 C IN/14
36 VTR WAR OUT
38 RET AUDIO-ST IN/OUT
40 VTR REC S/S IN
42 VTR S.CLOCK OUT
44 VTR S.DATA OUT
46 VIDEO IN/14
48 +12VII OUT
50 +12V IN
52 CLP1 IN
54 COMP-Y/C SELECT OUT
56 10P/14P SELECT OUT
58 ALC P/B IN
60 GROUND
CN5 (To MICROPROCESSOR BOARD ··· CN3)
2 GROUND
4 +1.8V IN
6 B-YLØ OUT
8 PED CONT OUT
10 IRIS CONT OUT
12 RCH W/B OUT
14 BCH W/B OUT
16 B VR IN
18 AGC(L) OUT
20 AGC ON/OFF(SW) IN
22 R VR IN
24 AF AREA IN
26 EVF CHARA OUT
28 VTR S DATA OUT
30 VTR S.DATA OUT (NOT USED)
1 GROUND
3 FADE CONT OUT
5 B-YL GAIN OUT
7 GAIN LOW/HIGH SW IN
9 AGC(H) OUT
11 SES SW IN
13 ATW/AWC SW IN
15 C/B CONT IN (NOT USED)
17 C/B L/B SELECT IN/OUT
19 AUTO LED OUT
21 RET CONT IN
23 ZOOM(T) OUT
25 ZOOM(W) OUT
27 +9V IN
29 D/A OUT
CN6 (To MICROPROCESSOR BOARD ··· CN2)
32 TALLY OUT
34 ZEBRA SELECT OUT
36 ATW/AWC OUT
38 VTR S.DATA IN
40 NEGA/POSI OUT
42 AF.S DATA OUT
44 AF.S CLOCK OUT
46 VIDEO CHARA OUT
48 HD IN
50 RCU INF IN
52 VTR P/B IN
54 10P/14P SELECT IN
56 LOW LIGHT IN
58 AUTO PRESET IN
60 VP IN
31 µ-COM P/B OUT
33 TILT OUT
35 PAN OUT
37 REC S/S IN
39 ATW LOW IN
41 SES CONT IN
43 C/B SELECT IN
45 AWC SET IN
47 B IN
49 R IN
51 C/B CONT IN
53 STANDBY OUT
55 SC1 IN
57 SC1 + DC OUT
59 B/W FADE OUT
CN7 (To MICROPROCESSOR BOARD ··· CN1)
62 +5VII(+5.4V) IN
64 10P/14P SELECT IN
66 VTR S.CLOCK OUT
68 VTR WAR IN
70 RET AUDIO-ST IN/OUT
72 NOT USED
74 IND SW OUT
76 C/R S.CLOCK IN/OUT
78 C/R S.DATA IN/OUT
80 VTR REC S/S OUT
82 NOT USED
84 GROUND
61 STANDBY SW IN
63 32PIN·S CLOCK IN
65 S.CLOCK IN
67 S.CLOCK OUT
69 S.DATA IN
71 32PIN·S.DATA IN
73 +12V IN
75 +5V IN
77 +1.5V IN
79 RET AUDIO OUT
81 VTR S.CLOCK IN
83 GROUND
CN8 (To SYNC BOARD ··· CN1)
2 GROUND
4 +5VII(+5.4V) IN
6 H PHASE CONT IN
8 GROUND
10 HD OUT
12 VD OUT
14 LSW IN
16 BFP OUT
18 SC90° SW1 IN
20 ALC GATE OUT
1 GROUND
3 +5VII(+5.4V) IN
5 FLD OUT
7 GROUND
9 SYNC OUT
11 INT/EXT OUT
13 SW90° SW2 IN
15 BGP OUT
17 G/L BSC IN
19 CP OUT (NOT USED)
CN9 (To SYNC BOARD ··· CN2)
22 SC1 OUT
24 SC1 OUT
26 SC2 OUT
28 VP OUT
30 NEGA/POSI IN
32 ZEBRA SELECT IN
34 VTR P/B OUT
36 µ-COM P/B IN
38 ALC P/B OUT
40 RET CONT IN
42 P/B 1 OUT
44 P/B 2 OUT (NOT USED)
46 +1.8V IN
48 +9V IN
50 GROUND
21 ZEBRA+VP OUT
23 G/L SYNC IN
25 FADE CONT IN
27 C. SBL OUT
29 RET VIDEO IN
31 ZEBRA VIDEO IN
33 VIDEO IN/14
35 10P/14P SELECT IN
37 C/B CONT IN
39 IND SW IN
41 EVF VIDEO IN
43 EVF VIDEO OUT
45 +1.8V IN
47 +9V IN
49 GROUND
CN10 (To POWER BOARD ··· CN1)
1 +9V OUT
3 AF+9.4V OUT
5 ZOOM+9.4V OUT
7 +27V OUT
9 +17V OUT
11 STANDBY IN
13 +5VII(+5.4V) OUT
15 +5V OUT
2 +12V IN
4 +12V IN
6 GROUND
8 GROUND
10 GROUND
12 GROUND
14 GROUND
15 GROUND
CN14 (32PIN CONNECTOR)
1 +1.8V OUT
2 C/B SELECT IN
3 32PIN S CLOCK IN
4 SC90° SW2 IN
5 VIDEO OUT/32
6 SC90° SW1 IN
7 R-YL/VTR REC S/S OUT
8 LCH+INT/EXT OUT
9 B-YL/YOUT/4 OUT
10 RCU INF IN
11 GROUND (AUDIO)
12 C/B L/V SELECT IN/OUT
13 BGP OUT
14 SC1 OUT
15 G/L BSC IN
16 G/L SYNC IN
17 32PIN S DATA IN
18 LSW IN
19 C.SBL OUT
20 BFP OUT
21 RET VIDEO OUT
22 SYNC OUT
23 VIDEO GROUND
24 TEMP INF OUT
25 VIDEO GROUND
26 H PHASE CONT IN
27 +12VII IN
28 C/B IN
29 +12VII IN
30 GROUND (NTSC)
31 +9V OUT
32 YH/YOUT/4 OUT
SW1
SW1 VTR COMPATIBILITY SWITCH
IC1
VDD
INH VEE VSS
Q1
Q2
D1
D2
D3
R1 1K
R2 33K
R3 24K
R4 24K
R5 82K
R12 22K
C1 33µF 16V
C2 0.1µF
C4 27µF 35V
C5 47µF 10V
C6 10µF 25V
C7 47µF 10V
C8 10µF 25V
C9 10µF 10V
C10 0.1µF
L1 8.2µH
L2
L3
+5V
+5VII
+9V
+12V
+12VII
+17V
+27V
+1.8V
+1.5V
7
8
9
10
11
12

<Index>

IC1	A11
Q1	A10
Q2	A11
D1	C10
D2	B9
D3	B8

CONDUCTOR VIEW OF

<Index>

(Component side)

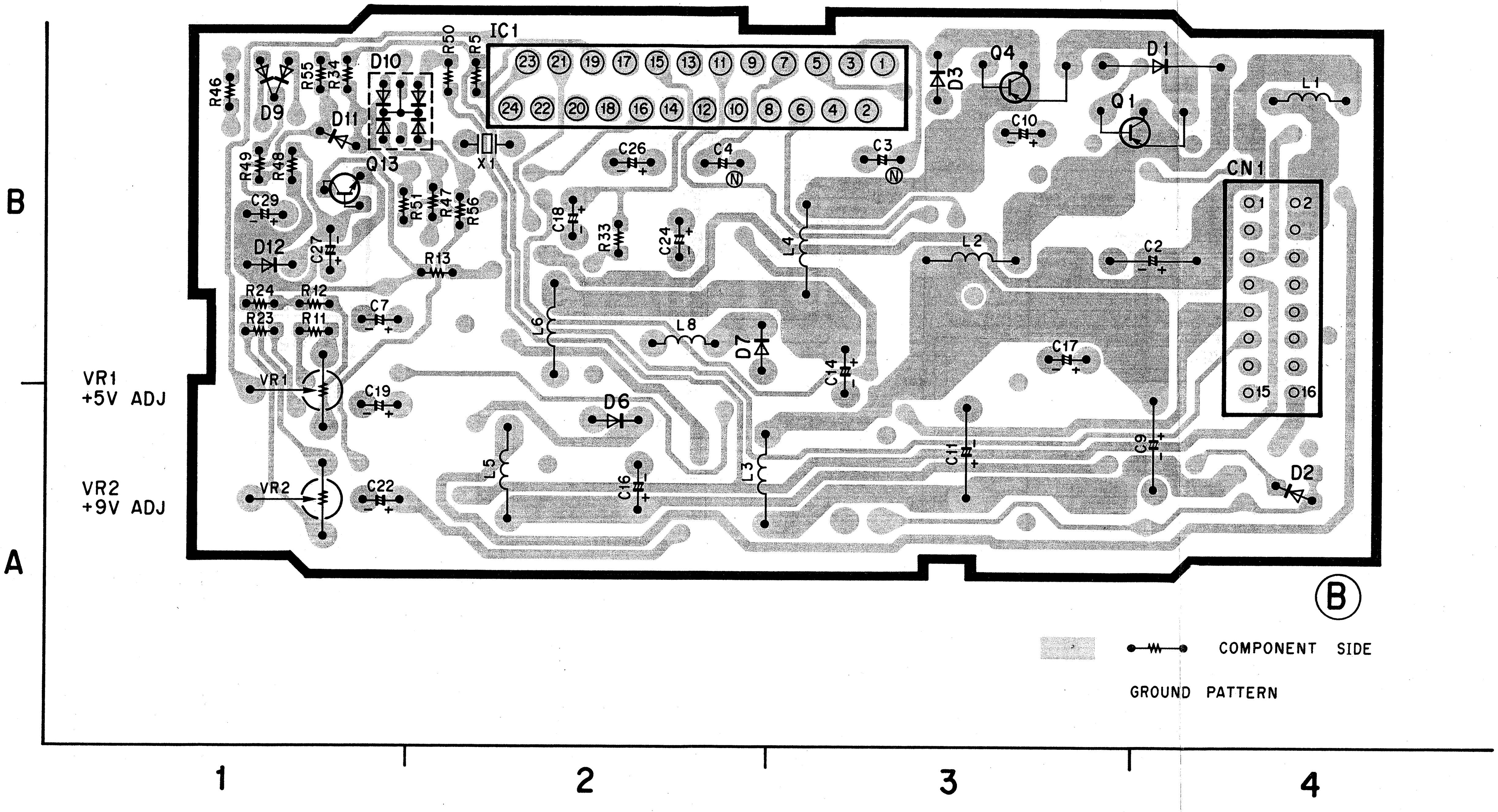
IC1	B2
Q1	B4
Q4	B3
Q13	B1
D1	B4
D2	A4
D3	B3
D6	A2
D7	B2
D9	B1
D10	B1
D11	B1
D12	B1

<Index>

(Pattern side)

IC2	B3
IC3	A2
IC4	B4
Q2	A1
Q3	B1
Q5	B2
Q6	B1
Q7	B3
Q8	A2
Q9	A3
Q10	A3
Q11	A3
Q12	B2
D4	B2
D5	B3
D8	A2

POWER BOARD


IC1
R46
D9
R55
R34
D10
R50
R5
D11
Q13
R49
R48
C29
D12
C27
R51
R47
R56
R13
X1
C26
C4
C3
C18
R33
C24
L4
Q4
D3
D1
Q1
C10
L1
CN1
1
2
15
16
L2
C2
R24
R12
R23
R11
C7
L6
L8
D7
C14
C17
VR1
+5V ADJ
C19
D6
L5
C16
L3
C11
C9
D2
VR2
+9V ADJ
C22
B
A
1
2
3
4
B

COMPONENT SIDE

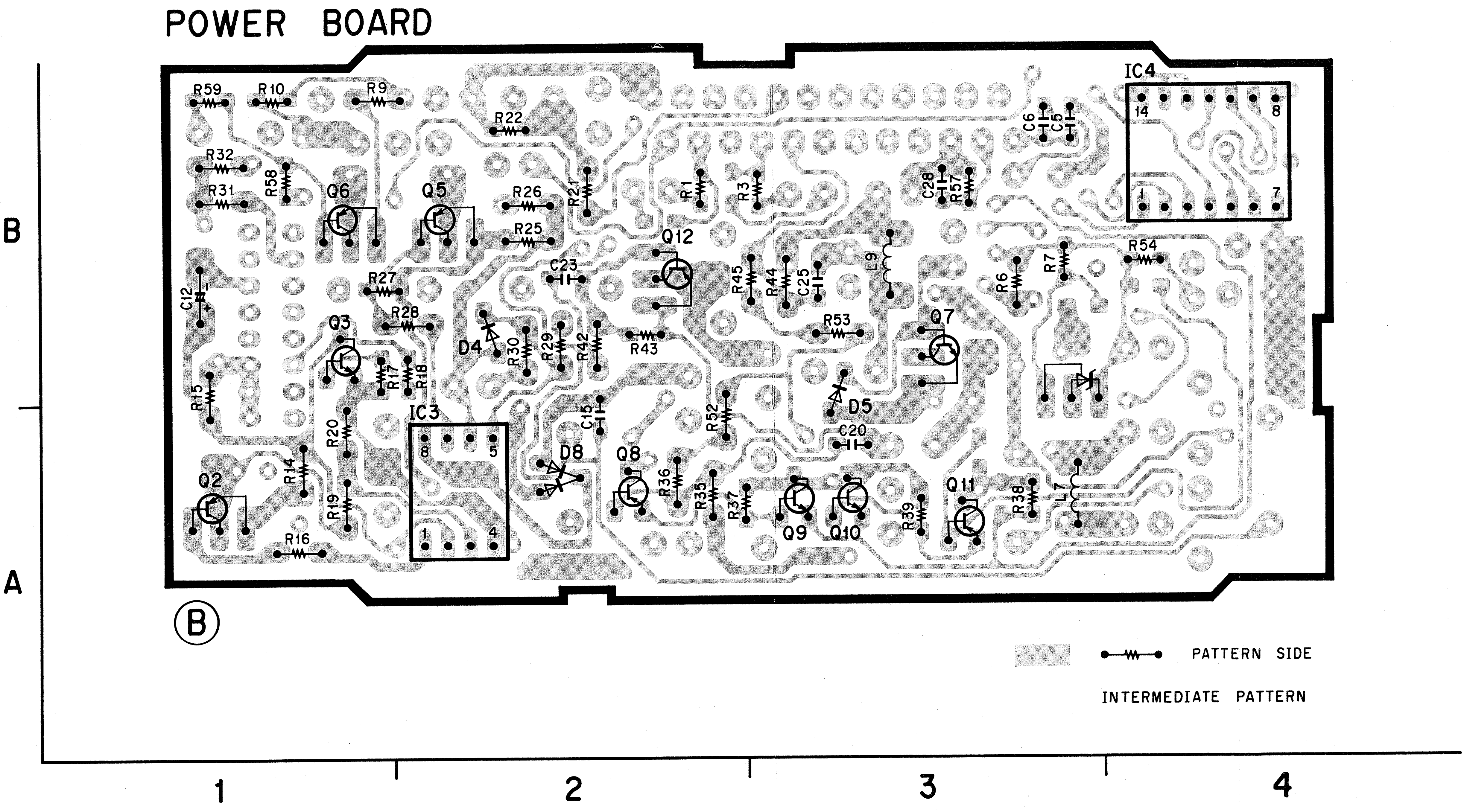
GROUND PATTERN

ƎW OF POWER BOARD

<Index>

(Pattern side)

IC2	B3
IC3	A2
IC4	B4
Q2	A1
Q3	B1
Q5	B2
Q6	B1
Q7	B3
Q8	A2
Q9	A3
Q10	A3
Q11	A3
Q12	B2
D4	B2
D5	B3
D8	A2


POWER BOARD
IC4
14
8
1
7
IC3
8
5
1
4
R59
R10
R9
R22
R32
R31
R58
Q6
Q5
R26
R25
R21
R1
R3
C6
C5
C28
R57
Q12
R45
R44
C25
L9
R6
R7
R54
C12
R27
C23
R28
D4
R30
R29
R42
R43
R53
Q7
Q3
R17
R18
R15
D5
R52
C15
C20
R20
D8
Q8
R14
R36
R35
R37
Q9
Q10
R39
Q11
R38
L7
Q2
R19
R16
B
B
A
1
2
3
4
PATTERN SIDE
INTERMEDIATE PATTERN

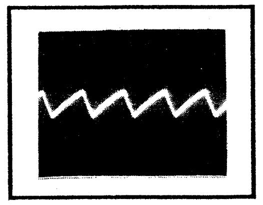
<Voltages>

	IC1	IC3	IC4
Pin 1	12.0	3.0	-
2	-	3.0	-
3	-	3.0	-
4	-	0	-
5	-	6.0	-
6	9.4	6.0	-
7	-	6.0	0
8	-	9.4	4.9
9	-		-
10	17.0		5.0
11	-		0
12	-		5.0
13	-		5.0
14	-		5.0
15	-		
16	2.5		
17	-		
18	-		
19	0		
20	0		
21	2.5		
22	-		
23	-		
24	-		

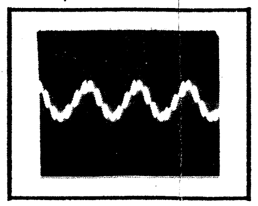
	B	C	E
Q 1	11.4	5.4	12.0
2	4.7	5.0	5.4
3	0	6.0	0
4	11.4	9.4	12.0
5	8.8	9.0	9.4
6	10.4	0	11.3
7	-	9.4	0
8	2.5	0	3.1
9	3.1	9.4	2.5
10	3.1	9.4	2.5
11	2.5	0	3.1
12	26.3	17.0	27.0
13	0.1	12.0	0

<Waveforms>

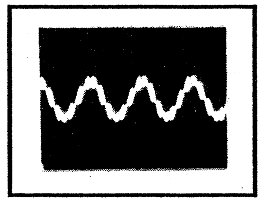
1. 5μsec/DIV, 2V/DIV



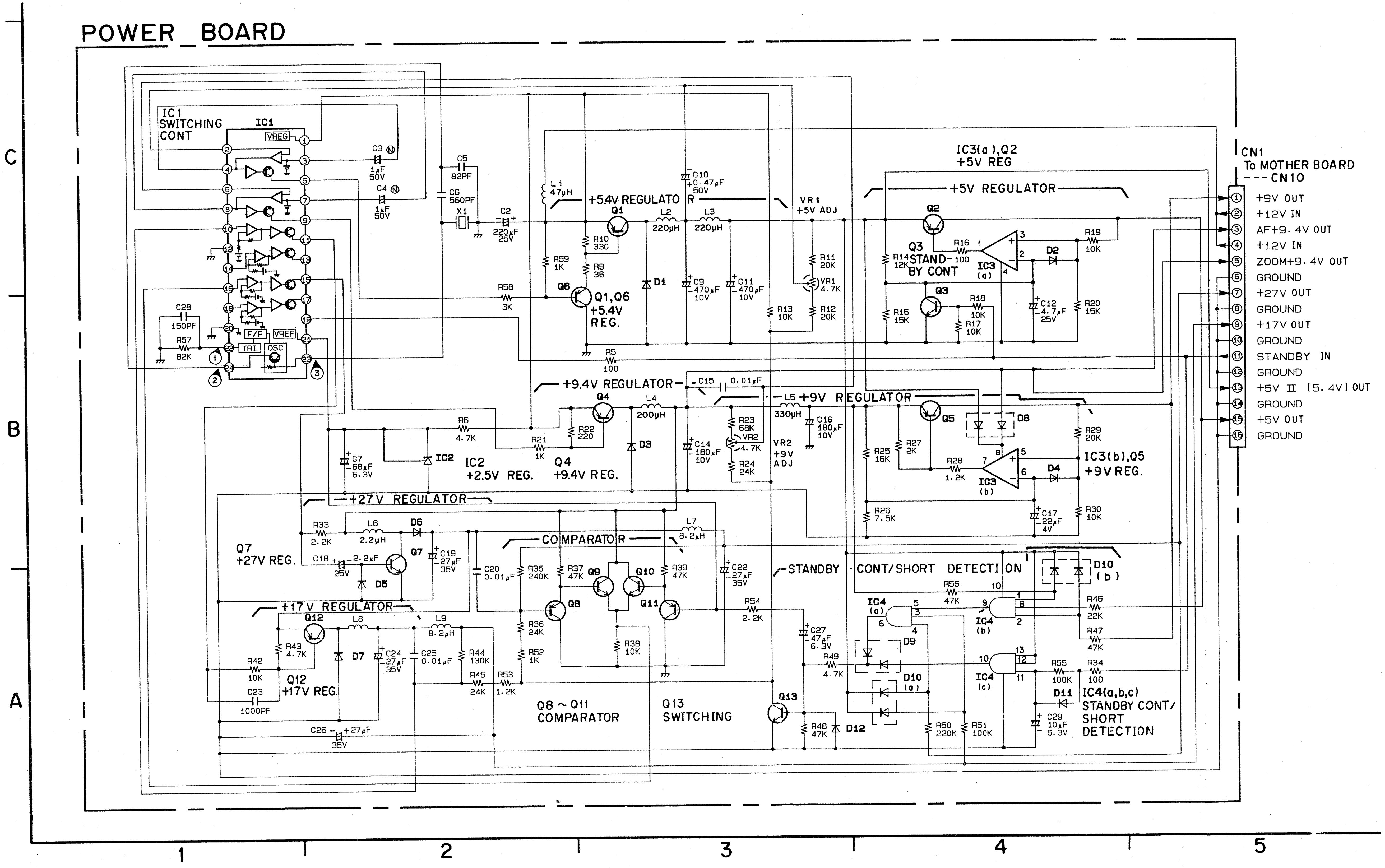
2. 0.5μsec/DIV, 2V/DIV



3. 0.5μsec/DIV, 2V/DIV



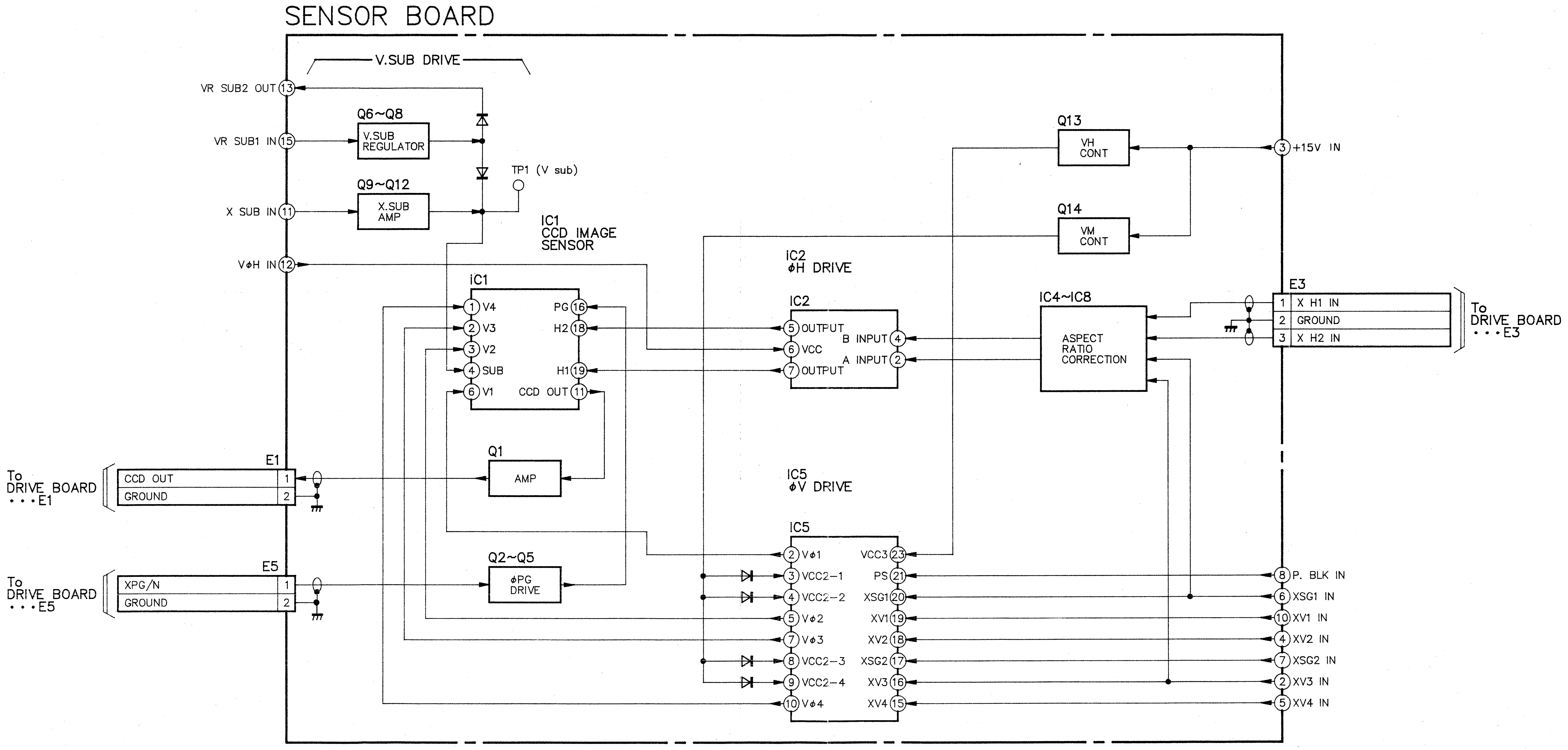
SCHEMATIC DIAGRAM OF POWER BOARD


POWER BOARD
IC1 SWITCHING CONT
IC1
VREG
F/F
VREF
TRI
OSC
C28 150PF
R57 82K
C3 1μF 50V
C4 1μF 50V
C5 82PF
C6 560PF
X1
C2 220μF 25V
R58 3K
L1 47μH
+54V REGULATOR
Q1
R10 330
R9 36
R59 1K
Q6
Q1,Q6 +5.4V REG.
L2 220μH
L3 220μH
C10 0.47μF 50V
D1
C9 470μF 10V
C11 470μF 10V
R5 100
VR1 +5V ADJ
R11 20K
VR1 4.7K
R13 10K
R12 20K
IC3(a),Q2 +5V REG
+5V REGULATOR
Q2
Q3 STAND-BY CONT
R14 12K
R16 100
IC3 (a)
R19 10K
D2
Q3
R15 15K
R18 10K
R17 10K
C12 4.7μF 25V
R20 15K
CN1 To MOTHER BOARD ---CN10
① +9V OUT
② +12V IN
③ AF+9.4V OUT
④ +12V IN
⑤ ZOOM+9.4V OUT
⑥ GROUND
⑦ +27V OUT
⑧ GROUND
⑨ +17V OUT
⑩ GROUND
⑪ STANDBY IN
⑫ GROUND
⑬ +5V II (5.4V) OUT
⑭ GROUND
⑮ +5V OUT
⑯ GROUND
+9.4V REGULATOR
C15 0.01μF
Q4
L4 200μH
R6 4.7K
R21 1K
R22 220
C7 68μF 6.3V
IC2
IC2 +2.5V REG.
Q4 +9.4V REG.
D3
C14 180μF 10V
R23 68K
VR2 4.7K
R24 24K
VR2 +9V ADJ
L5 330μH
+9V REGULATOR
C16 180μF 10V
Q5
D8
R25 16K
R27 2K
R28 1.2K
IC3 (b)
D4
R29 20K
IC3(b),Q5 +9V REG.
R26 7.5K
C17 22μF 4V
R30 10K
+27V REGULATOR
R33 2.2K
L6 2.2μH
D6
Q7 +27V REG.
C18 2.2μF 25V
Q7
C19 27μF 35V
D5
COMPARATOR
C20 0.01μF
R35 240K
R37 47K
Q9
Q10
R39 47K
Q8
Q11
L7 8.2μH
C22 27μF 35V
R36 24K
R52 1K
R38 10K
STANDBY CONT/SHORT DETECTION
R54 2.2K
C27 47μF 6.3V
R49 4.7K
IC4 (a)
D9
D10 (a)
R56 47K
IC4 (b)
D10 (b)
R46 22K
R47 47K
IC4 (c)
R55 100K
R34 100
D11
C29 10μF 6.3V
IC4(a,b,c) STANDBY CONT/ SHORT DETECTION
Q13
R48 47K
D12
R50 220K
R51 100K
+17V REGULATOR
Q12
R43 4.7K
R42 10K
Q12 +17V REG.
C23 1000PF
L8
D7
C24 27μF 35V
C25 0.01μF
L9 8.2μH
R44 130K
R45 24K
R53 1.2K
C26 27μF 35V
Q8～Q11 COMPARATOR
Q13 SWITCHING
C
B
A
1
2
3
4
5

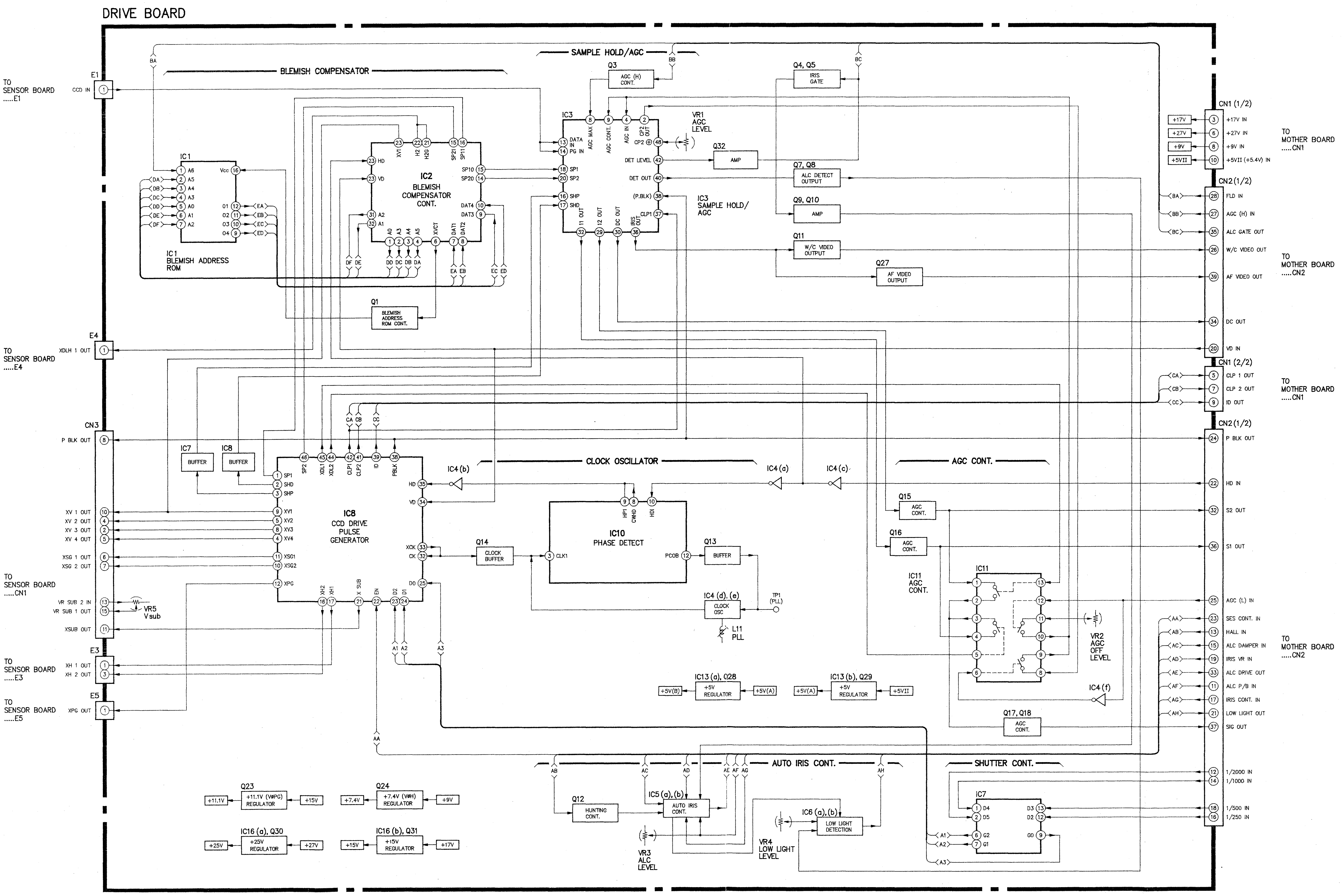
<Index>

IC1	C1
IC2	B2
IC3	C4
IC4	A4
Q1	C3
Q2	C4
Q3	B4
Q4	B3
Q5	B4
Q6	B3
Q7	B2
Q8	A2
Q9	A3
Q10	A3
Q11	A3
Q12	A2
Q13	A3
D1	C3
D2	C4
D3	B3
D4	B4
D5	A2
D6	B2
D7	A2
D8	B4
D9	A4
D10	A4
D11	A4
D12	A3

BLOCK DIAGRAM OF SENSOR BOARD

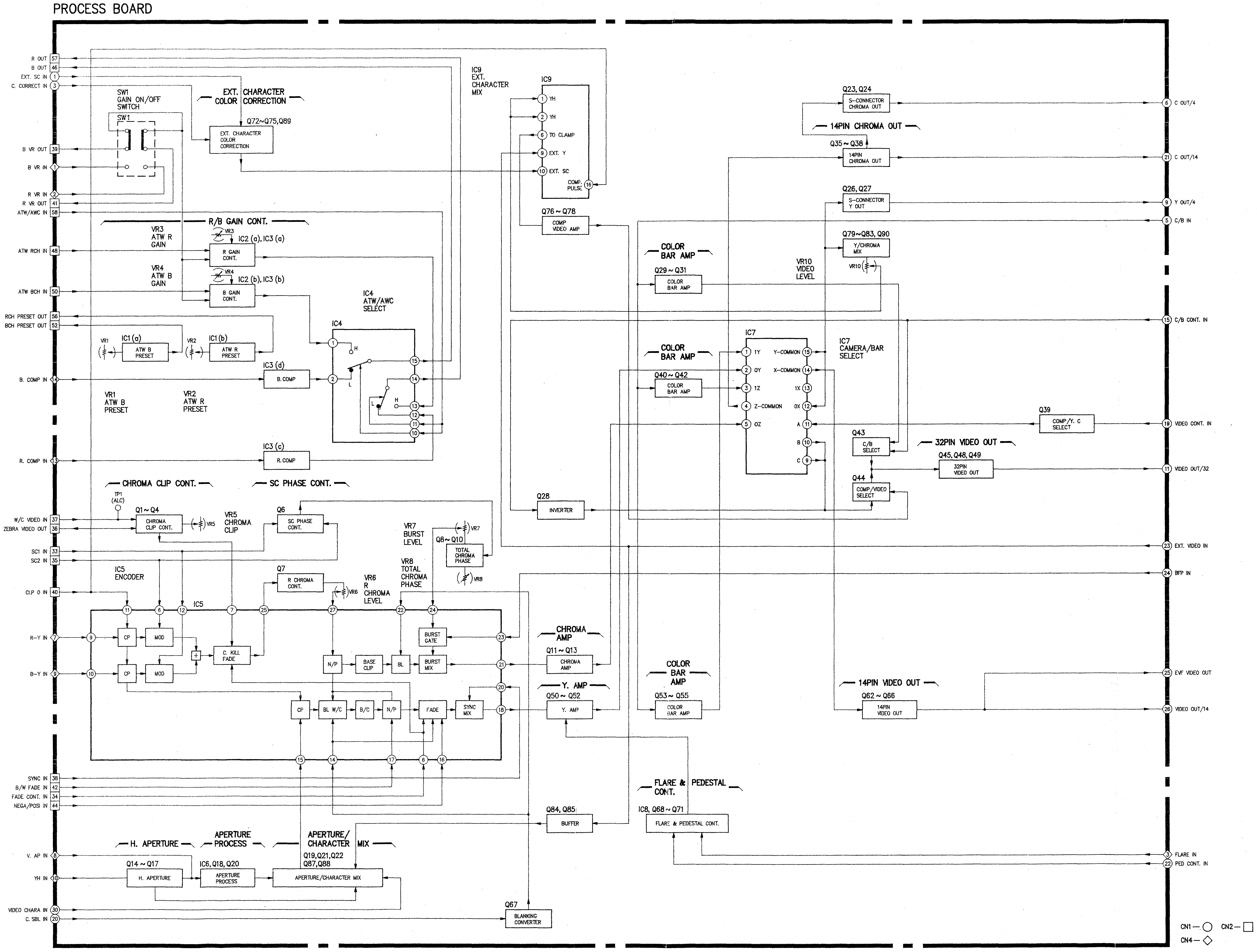

SENSOR BOARD
V.SUB DRIVE
VR SUB2 OUT 13
Q6~Q8
V.SUB REGULATOR
VR SUB1 IN 15
TP1 (V sub)
Q9~Q12
X.SUB AMP
X SUB IN 11
IC1 CCD IMAGE SENSOR
VφH IN 12
IC1
1 V4
2 V3
3 V2
4 SUB
6 V1
PG 16
H2 18
H1 19
CCD OUT 11
IC2 φH DRIVE
IC2
5 OUTPUT
6 VCC
7 OUTPUT
B INPUT 4
A INPUT 2
Q13
VH CONT
Q14
VM CONT
3 +15V IN
IC4~IC8
ASPECT RATIO CORRECTION
E3
1 X H1 IN
2 GROUND
3 X H2 IN
To DRIVE BOARD • • • E3
E1
CCD OUT 1
GROUND 2
To DRIVE BOARD • • • E1
Q1
AMP
IC5 φV DRIVE
IC5
2 Vφ1
3 VCC2-1
4 VCC2-2
5 Vφ2
7 Vφ3
8 VCC2-3
9 VCC2-4
10 Vφ4
VCC3 23
PS 21
XSG1 20
XV1 19
XV2 18
XSG2 17
XV3 16
XV4 15
Q2~Q5
φPG DRIVE
E5
XPG/N 1
GROUND 2
To DRIVE BOARD • • • E5
8 P. BLK IN
6 XSG1 IN
10 XV1 IN
4 XV2 IN
7 XSG2 IN
2 XV3 IN
5 XV4 IN

BLOCK DIAGRAM OF DRIVE BOARD

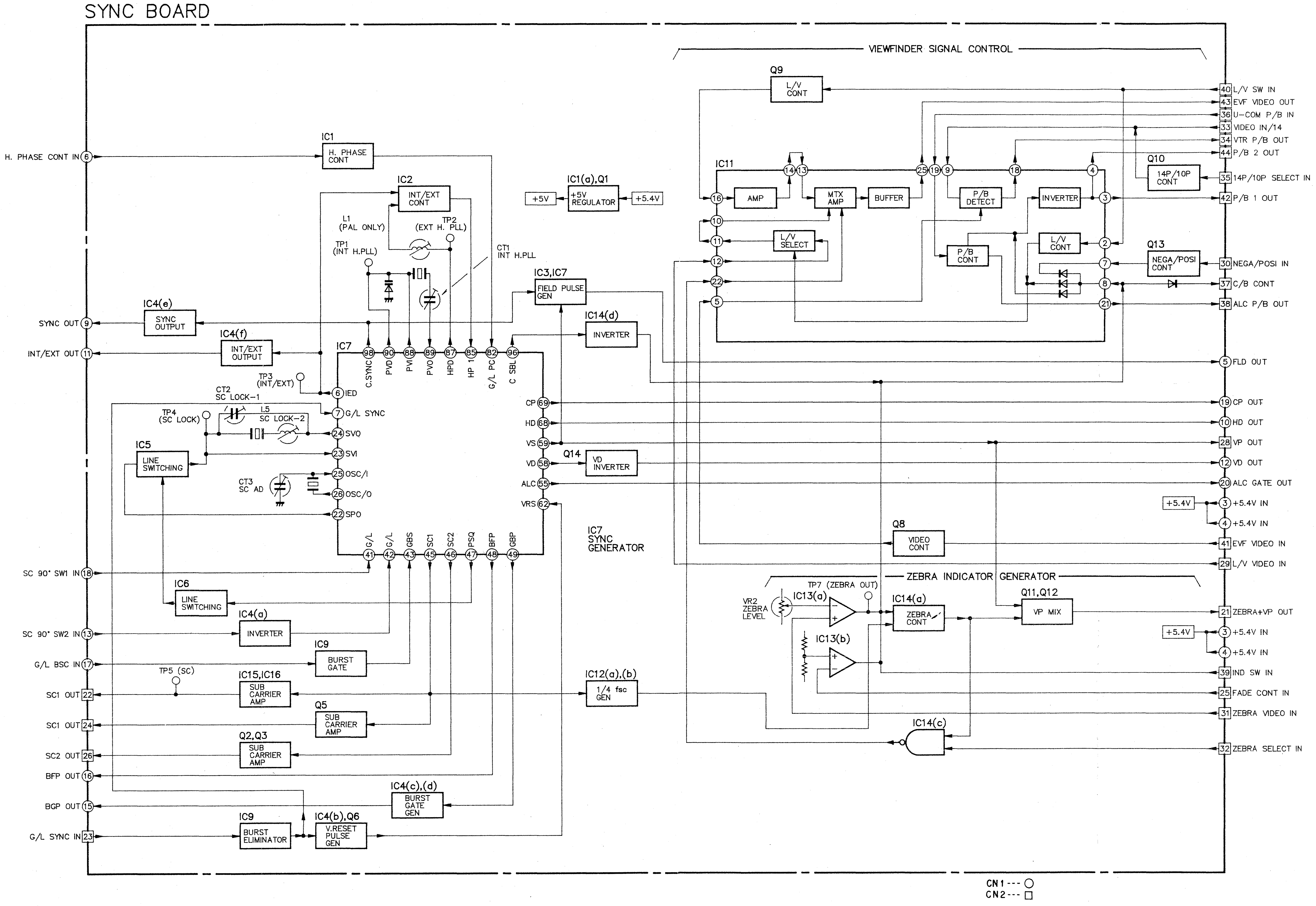


DRIVE BOARD
TO SENSOR BOARD E1
E1
CCD IN
TO SENSOR BOARD E4
E4
XDLH 1 OUT
CN3
P BLK OUT
XV 1 OUT
XV 2 OUT
XV 3 OUT
XV 4 OUT
XSG 1 OUT
XSG 2 OUT
TO SENSOR BOARD CN1
VR SUB 2 IN
VR SUB 1 OUT
VR5 Vsub
XSUB OUT
TO SENSOR BOARD E3
E3
XH 1 OUT
XH 2 OUT
TO SENSOR BOARD E5
E5
XPG OUT
BLEMISH COMPENSATOR
IC1
IC1 BLEMISH ADDRESS ROM
IC2 BLEMISH COMPENSATOR CONT.
Q1 BLEMISH ADDRESS ROM CONT.
SAMPLE HOLD/AGC
Q3 AGC (H) CONT.
IC3
IC3 SAMPLE HOLD/AGC
VR1 AGC LEVEL
Q32 AMP
Q4, Q5 IRIS GATE
Q7, Q8 ALC DETECT OUTPUT
Q9, Q10 AMP
Q11 W/C VIDEO OUTPUT
Q27 AF VIDEO OUTPUT
IC7 BUFFER
IC8 BUFFER
IC8 CCD DRIVE PULSE GENERATOR
IC4(b)
CLOCK OSCILLATOR
IC4(a)
IC4(c)
IC10 PHASE DETECT
Q14 CLOCK BUFFER
Q13 BUFFER
IC4 (d), (e) CLOCK OSC
TP1 (PLL)
L11 PLL
AGC CONT.
Q15 AGC CONT.
Q16 AGC CONT.
IC11 AGC CONT.
IC11
VR2 AGC OFF LEVEL
IC4 (f)
Q17, Q18 AGC CONT.
IC13 (a), Q28 +5V REGULATOR
+5V(B)
+5V(A)
IC13 (b), Q29 +5V REGULATOR
+5VII
Q23 +11.1V (V#PG) REGULATOR
+11.1V
+15V
Q24 +7.4V (V#H) REGULATOR
+7.4V
+9V
IC16 (a), Q30 +25V REGULATOR
+25V
+27V
IC16 (b), Q31 +15V REGULATOR
+17V
AUTO IRIS CONT.
Q12 HUNTING CONT.
IC5 (a), (b) AUTO IRIS CONT.
VR3 ALC LEVEL
IC6 (a), (b) LOW LIGHT DETECTION
VR4 LOW LIGHT LEVEL
SHUTTER CONT.
IC7
CN1 (1/2)
+17V IN
+27V IN
+9V IN
+5VII (+5.4V) IN
TO MOTHER BOARD CN1
CN2 (1/2)
FLD IN
AGC (H) IN
ALC GATE OUT
W/C VIDEO OUT
AF VIDEO OUT
TO MOTHER BOARD CN2
DC OUT
VD IN
CN1 (2/2)
CLP 1 OUT
CLP 2 OUT
ID OUT
TO MOTHER BOARD CN1
CN2 (1/2)
P BLK OUT
HD IN
S2 OUT
S1 OUT
AGC (L) IN
SES CONT. IN
HALL IN
ALC DAMPER IN
IRIS VR IN
ALC DRIVE OUT
ALC P/B IN
IRIS CONT. IN
LOW LIGHT OUT
SIG OUT
TO MOTHER BOARD CN2
1/2000 IN
1/1000 IN
1/500 IN
1/250 IN

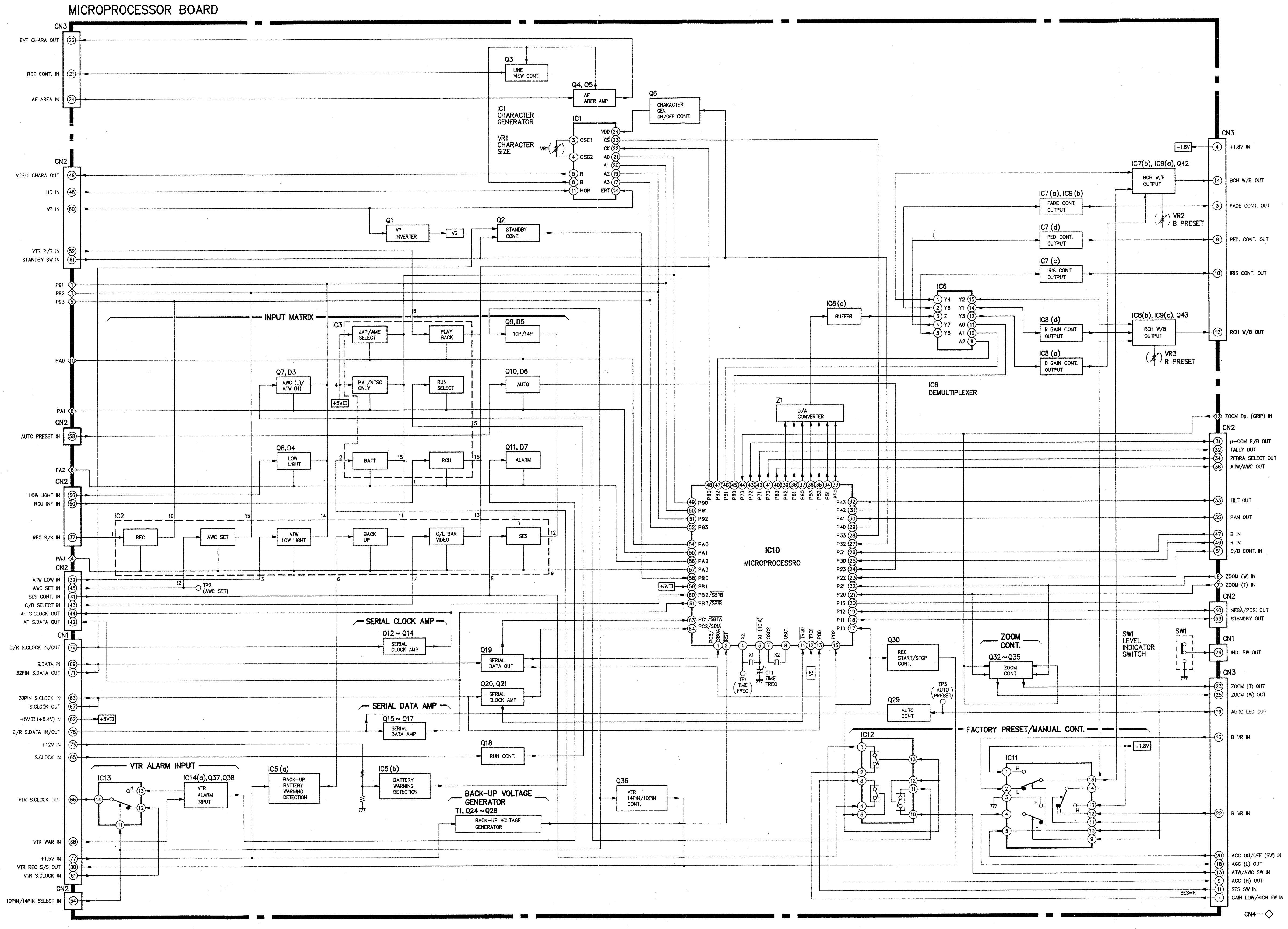
BLOCK DIAGRAM OF PROCESS BOARD


PROCESS BOARD
R OUT 57
B OUT 46
EXT. SC IN 1
C. CORRECT IN 3
SW1 GAIN ON/OFF SWITCH
SW1
B VR OUT 39
B VR IN 1
R VR IN 2
R VR OUT 41
ATW/AWC IN 58
EXT. COLOR CHARACTER CORRECTION
Q72~Q75,Q89
EXT. CHARACTER COLOR CORRECTION
IC9 EXT. CHARACTER MIX
IC9
1 YH
2 YH
6 TO CLAMP
9 EXT. Y
10 EXT. SC
COMP. PULSE 16
Q76~Q78
COMP VIDEO AMP
R/B GAIN CONT.
VR3 ATW R GAIN
VR3
IC2 (a), IC3 (a)
R GAIN CONT.
VR4 ATW B GAIN
VR4
IC2 (b), IC3 (b)
B GAIN CONT.
ATW RCH IN 48
ATW BCH IN 50
RCH PRESET OUT 56
BCH PRESET OUT 52
VR1
IC1 (a)
ATW B PRESET
VR2
IC1 (b)
ATW R PRESET
IC4 ATW/AWC SELECT
IC4
H
L
IC3 (d)
B. COMP
B. COMP IN 14
VR1 ATW B PRESET
VR2 ATW R PRESET
IC3 (c)
R. COMP
R. COMP IN 13
CHROMA CLIP CONT.
SC PHASE CONT.
TP1 (ALC)
Q1~Q4
CHROMA CLIP CONT.
VR5
VR5 CHROMA CLIP
Q6
SC PHASE CONT.
W/C VIDEO IN 37
ZEBRA VIDEO OUT 36
SC1 IN 33
SC2 IN 35
VR7 BURST LEVEL
VR7
Q8~Q10
TOTAL CHROMA PHASE
VR8 TOTAL CHROMA PHASE
VR8
IC5 ENCODER
Q7
R CHROMA CONT.
VR6
VR6 R CHROMA LEVEL
CLP 0 IN 40
IC5
R−Y IN 7
B−Y IN 9
CP
MOD
+
C. KILL FADE
N/P
BASE CLIP
BL
BURST GATE
BURST MIX
CP
BL W/C
B/C
N/P
FADE
SYNC MIX
CHROMA AMP
Q11~Q13
CHROMA AMP
Y. AMP
Q50~Q52
Y. AMP
SYNC IN 38
B/W FADE IN 42
FADE CONT. IN 34
NEGA/POSI IN 44
Q84, Q85
BUFFER
H. APERTURE
APERTURE PROCESS
APERTURE/CHARACTER MIX
Q14~Q17
H. APERTURE
IC6, Q18, Q20
APERTURE PROCESS
Q19,Q21,Q22 Q87,Q88
APERTURE/CHARACTER MIX
V. AP IN 8
YH IN 10
VIDEO CHARA IN 30
C. SBL IN 20
Q67
BLANKING CONVERTER
Q23, Q24
S-CONNECTOR CHROMA OUT
14PIN CHROMA OUT
Q35~Q38
14PIN CHROMA OUT
Q26, Q27
S-CONNECTOR Y OUT
Q79~Q83, Q90
Y/CHROMA MIX
VR10
VR10 VIDEO LEVEL
COLOR BAR AMP
Q29~Q31
COLOR BAR AMP
Q28
INVERTER
IC7
1 1Y
2 0Y
3 1Z
4 Z-COMMON
5 0Z
Y-COMMON 15
X-COMMON 14
1X 13
0X 12
A 11
B 10
C 9
IC7 CAMERA/BAR SELECT
COLOR BAR AMP
Q40~Q42
COLOR BAR AMP
Q39
COMP/Y. C SELECT
Q43
C/B SELECT
32PIN VIDEO OUT
Q45, Q48, Q49
32PIN VIDEO OUT
Q44
COMP/VIDEO SELECT
COLOR BAR AMP
Q53~Q55
COLOR BAR AMP
14PIN VIDEO OUT
Q62~Q66
14PIN VIDEO OUT
FLARE & PEDESTAL CONT.
IC8, Q68~Q71
FLARE & PEDESTAL CONT.
6 C OUT/4
21 C OUT/14
9 Y OUT/4
5 C/B IN
15 C/B CONT. IN
19 VIDEO CONT. IN
11 VIDEO OUT/32
23 EXT. VIDEO IN
24 BFP IN
25 EVF VIDEO OUT
26 VIDEO OUT/14
3 FLARE IN
22 PED CONT. IN
CN1 — ○
CN2 — □
CN4 — ◇

BLOCK DIAGRAM OF SYNC BOARD

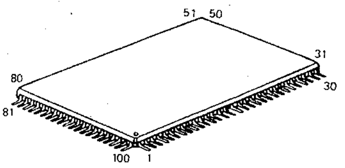

SYNC BOARD
VIEWFINDER SIGNAL CONTROL
H. PHASE CONT IN 6
SYNC OUT 9
INT/EXT OUT 11
SC 90° SW1 IN 18
SC 90° SW2 IN 13
G/L BSC IN 17
SC1 OUT 22
SC1 OUT 24
SC2 OUT 26
BFP OUT 16
BGP OUT 15
G/L SYNC IN 23
IC1
H. PHASE CONT
IC2
INT/EXT CONT
IC1(a),Q1
+5V
+5V REGULATOR
+5.4V
L1 (PAL ONLY)
TP2 (EXT H. PLL)
TP1 (INT H.PLL)
CT1 INT H.PLL
IC3,IC7
FIELD PULSE GEN
IC4(e)
SYNC OUTPUT
IC4(f)
INT/EXT OUTPUT
IC14(d)
INVERTER
IC7
C.SYNC 98
PVD 90
PVI 88
PVO 89
HPD 87
HP 1 85
G/L PC 82
C SBL 96
TP3 (INT/EXT)
6 IED
CT2 SC LOCK-1
7 G/L SYNC
TP4 (SC LOCK)
L5 SC LOCK-2
24 SVO
23 SVI
IC5
LINE SWITCHING
CT3 SC AD
25 OSC/I
26 OSC/O
22 SPO
CP 69
HD 68
VS 59
VD 58
ALC 55
VRS 62
Q14
VD INVERTER
IC7 SYNC GENERATOR
G/L 41
G/L 42
GBS 43
SC1 45
SC2 46
PSQ 47
BFP 48
GBP 49
IC6
LINE SWITCHING
IC4(a)
INVERTER
IC9
BURST GATE
TP5 (SC)
IC15,IC16
SUB CARRIER AMP
Q5
SUB CARRIER AMP
Q2,Q3
SUB CARRIER AMP
IC4(c),(d)
BURST GATE GEN
IC9
BURST ELIMINATOR
IC4(b),Q6
V.RESET PULSE GEN
IC12(a),(b)
1/4 fsc GEN
Q9
L/V CONT
IC11
14 13
16 AMP
MTX AMP
BUFFER
25 19 9
18
P/B DETECT
INVERTER
4
3
10
11
L/V SELECT
P/B CONT
L/V CONT
2
12
22
5
7
8
21
Q10
14P/10P CONT
Q13
NEGA/POSI CONT
40 L/V SW IN
43 EVF VIDEO OUT
36 U-COM P/B IN
33 VIDEO IN/14
34 VTR P/B OUT
44 P/B 2 OUT
35 14P/10P SELECT IN
42 P/B 1 OUT
30 NEGA/POSI IN
37 C/B CONT
38 ALC P/B OUT
5 FLD OUT
19 CP OUT
10 HD OUT
28 VP OUT
12 VD OUT
20 ALC GATE OUT
+5.4V
3 +5.4V IN
4 +5.4V IN
Q8
VIDEO CONT
41 EVF VIDEO IN
29 L/V VIDEO IN
ZEBRA INDICATOR GENERATOR
TP7 (ZEBRA OUT)
VR2 ZEBRA LEVEL
IC13(a)
IC13(b)
IC14(a)
ZEBRA CONT
Q11,Q12
VP MIX
21 ZEBRA+VP OUT
+5.4V
3 +5.4V IN
4 +5.4V IN
39 IND SW IN
25 FADE CONT IN
31 ZEBRA VIDEO IN
IC14(c)
32 ZEBRA SELECT IN
CN1 --- ○
CN2 --- □

BLOCK DIAGRAM OF MICROPROCESSOR BOARD

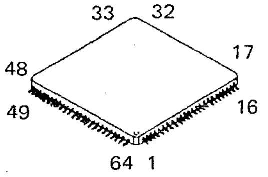

MICROPROCESSOR BOARD
CN3
EVF CHARA OUT 26
RET CONT. IN 21
AF AREA IN 24
CN2
VIDEO CHARA OUT 46
HD IN 48
VP IN 60
VTR P/B IN 52
STANDBY SW IN 61
P91 1
P92 3
P93 5
PA0 10
PA1 8
AUTO PRESET IN 58
PA2 6
LOW LIGHT IN 56
RCU INF IN 50
REC S/S IN 37
PA3 4
ATW LOW IN 39
AWC SET IN 45
SES CONT. IN 41
C/B SELECT IN 43
AF S.CLOCK OUT 44
AF S.DATA OUT 42
CN1
C/R S.CLOCK IN/OUT 76
S.DATA IN 69
32PIN S.DATA OUT 71
32PIN S.CLOCK IN 63
S.CLOCK OUT 67
+5V II (+5.4V) IN 62
C/R S.DATA IN/OUT 78
+12V IN 73
S.CLOCK IN 65
VTR S.CLOCK OUT 66
VTR WAR IN 68
+1.5V IN 77
VTR REC S/S OUT 80
VTR S.CLOCK IN 81
10PIN/14PIN SELECT IN 54
Q3
LINE VIEW CONT.
Q4, Q5
AF ARER AMP
Q6
CHARACTER GEN ON/OFF CONT.
IC1 CHARACTER GENERATOR
VR1 CHARACTER SIZE
IC1
OSC1 OSC2 R B HOR VDD CS CK A0 A1 A2 A3 ERT
Q1
VP INVERTER
VS
Q2
STANDBY CONT.
INPUT MATRIX
IC3
JAP/AME SELECT
PLAY BACK
PAL/NTSC ONLY
RUN SELECT
BATT
RCU
+5VII
Q7, D3
AWC (L)/ ATW (H)
Q8, D4
LOW LIGHT
Q9, D5
10P/14P
Q10, D6
AUTO
Q11, D7
ALARM
IC2
REC
AWC SET
ATW LOW LIGHT
BACK UP
C/L BAR VIDEO
SES
TP2 (AWC SET)
SERIAL CLOCK AMP
Q12~Q14
SERIAL CLOCK AMP
Q19
SERIAL DATA OUT
Q20, Q21
SERIAL CLOCK AMP
SERIAL DATA AMP
Q15~Q17
SERIAL DATA AMP
Q18
RUN CONT.
VTR ALARM INPUT
IC13
IC14(a), Q37, Q38
VTR ALARM INPUT
IC5 (a)
BACK-UP BATTERY WARNING DETECTION
IC5 (b)
BATTERY WARNING DETECTION
BACK-UP VOLTAGE GENERATOR
T1, Q24~Q28
BACK-UP VOLTAGE GENERATOR
Q36
VTR 14PIN/10PIN CONT.
Z1
D/A CONVERTER
IC10
MICROPROCESSRO
P90 P91 P92 P93 PA0 PA1 PA2 PA3 PB0 PB1 PB2/SBTB PB3/SBIB PC1/SBTA PC2/SBIA PC3/SBOA RST
P83 P82 P81 P80 P73 P72 P71 P70 P63 P62 P61 P60 P53 P52 P51 P50
P43 P42 P41 P40 P33 P32 P31 P30 P23 P22 P21 P20 P13 P12 P11 P10
X2 X1 (TCIA) OSC2 OSC1 TRQ0 TRQ1 P00 P02
X1 X2
TP1 (TIME FREQ)
CT1 TIME FREQ
IC8 (c)
BUFFER
IC6
Y4 Y6 Z Y7 Y5 Y2 Y1 Y3 A0 A1 A2
IC6 DEMULTIPLEXER
IC7(b), IC9(a), Q42
BCH W/B OUTPUT
VR2 B PRESET
IC7 (a), IC9 (b)
FADE CONT. OUTPUT
IC7 (d)
PED CONT. OUTPUT
IC7 (c)
IRIS CONT. OUTPUT
IC8 (d)
R GAIN CONT. OUTPUT
IC8 (a)
B GAIN CONT. OUTPUT
IC8(b), IC9(c), Q43
RCH W/B OUTPUT
VR3 R PRESET
+1.8V
4 +1.8V IN
14 BCH W/B OUT
3 FADE CONT. OUT
8 PED. CONT. OUT
10 IRIS CONT. OUT
12 RCH W/B OUT
12 ZOOM Bp. (GRIP) IN
31 μ-COM P/B OUT
32 TALLY OUT
34 ZEBRA SELECT OUT
36 ATW/AWC OUT
33 TILT OUT
35 PAN OUT
47 B IN
49 R IN
51 C/B CONT. IN
9 ZOOM (W) IN
7 ZOOM (T) IN
40 NEGA/POSI OUT
53 STANDBY OUT
74 IND. SW OUT
23 ZOOM (T) OUT
25 ZOOM (W) OUT
19 AUTO LED OUT
16 B VR IN
22 R VR IN
20 AGC ON/OFF (SW) IN
18 AGC (L) OUT
13 ATW/AWC SW IN
9 AGC (H) OUT
11 SES SW IN
7 GAIN LOW/HIGH SW IN
SES=H
CN4 —◇
Q30
REC START/STOP CONT.
ZOOM CONT.
Q32~Q35
ZOOM CONT.
SW1 LEVEL INDICATOR SWITCH
SW1
TP3 (AUTO PRESET)
Q29
AUTO CONT.
FACTORY PRESET/MANUAL CONT.
IC12
IC11
H L

APPEARANCE OF IC, TRANSISTOR AND DIODE

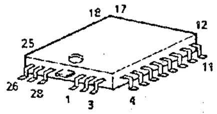
YWMB87075A


51 50
31
80
30
81
100 1

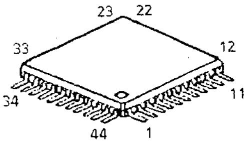
MN17581CC02


33 32
17
48
49
16
64 1

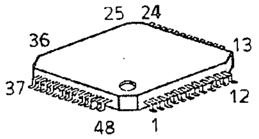
YWHA11776AMP


18 17
12
25
11
26
28
1 3
4

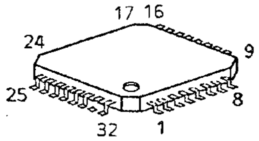
MN53010LVN


23 22
33
12
34
11
44 1

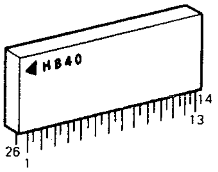
YWCXA1338Q
YWCXA1339Q
YWCXA1337Q
YWCXD1149Q


25 24
36
13
37
12
48 1

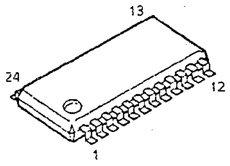
YWCXD1251Q


17 16
24
9
25
8
32 1

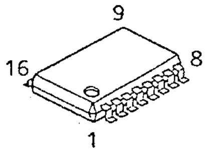
HB40


HB40
14
13
26
1

AN2210S
M50450FP
YWCXA1065M



MN4049BS
AN90B81S
AN90B82S
MN4532BS
MN74HC161S
YWNJU4053M
YWNJU4051M



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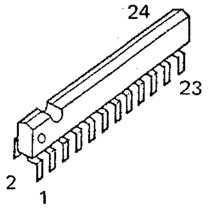

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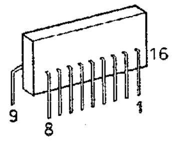

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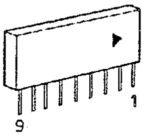
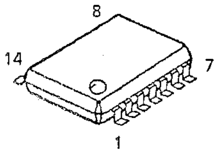
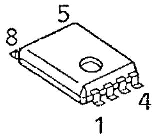


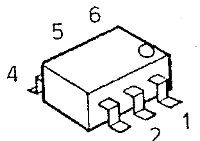
MN4073BS
MN74HC74S
MN74HC4066S
MN4066BS
NJU74HCOOM
NJM319M
MN74HC02S
MN74HCU04
NJM2901M
NJM2902M



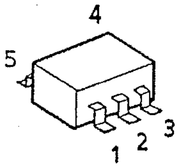
NJM2903
NJM2904M
YWNJM2228
YWNJ2240M
NJM4558M
NJM3414M
NJM3415M
YWCXB0026AM



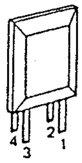
XN4601
XN6501



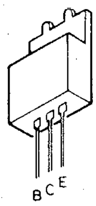
M51951AMLW
YWTC7S32FR
YWTC4S66FR
YWTC7S02FR
YWTC4S81FR
YWTC7504F
YWTC7508FR



AN608



2SB837-CD



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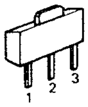
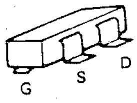
2SD874A-RS

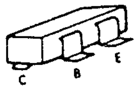


APPEARANCE OF IC, TRANSISTOR AND DIODE

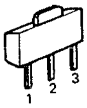
2SK662-PQR



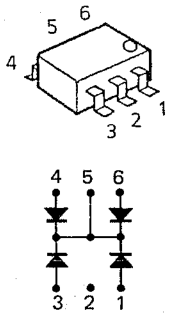
2SA1462
2SB709-RS
2SB1218-QRS
2SD1820-QRS
2SB970-RS
2SC3735
2SC2404-CD
2SC2405ST
2SC3931-CD
2SD601-RS
2SD602-QRS
2SD1819-QRS
2SB1219-QRS
2SA1532-CD



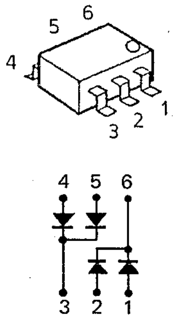
2SB766
2SD874A-RS



MA124


6
5
4
3
2
1
4 5 6
3 2 1

MA123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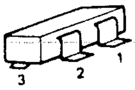
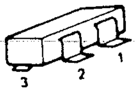
3
2
1
4 5 6
3 2 1

MA143



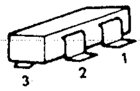
1 : Cathode
2 : Anode
3 : Common

MA141WA



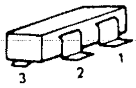
1 : Cathode
2 : Cathode
3 : Anode

MA151K
MA141K



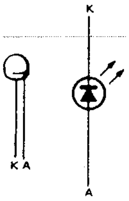
1 : NC
2 : Anode
3 : Cathode

MA141WK



1 : Anode
2 : Anode
3 : Cathode

LN23SRP
LN33SGP



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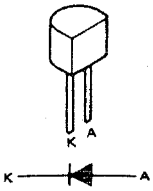
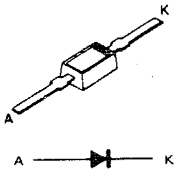
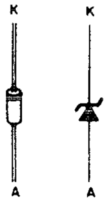


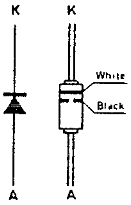
1SV153



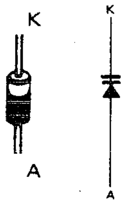
HZ9LB-2
HZ3BLL



1SS108


K
K
White
Black
A
A

EK14B



Service Manual

System Camera

WV-F15E

Vol. 4

Replacement Parts List
Exploded View

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REPLACEMENT PARTS LIST

Important Notice

1. Components identified by "⚠" mark have special characteristics important for safety.
   When replacing any of these components, use only manufacturer's specified parts.
2. Printed circuit board assembly with mark (NLA) is no longer available after production discontinuation of the complete set.

VIDEO CAMERA HEAD

MISCELLANEOUS

REF.NO.	PART NO.	DESCRIPTION
IC101	YWF15ATW	ATW Electric Assy
CF1,2	YW2677006302	Feright Bees
CN101	YWD0111N200	10-pin Title Connector
CN102	YWD0121N200	10-pin EVF Connector
CN103	YWD5110N200	5-pin PAN/TILT Connector
CN104	YWF15VTR10PA	10-pin VTR Connector
CN105	YWSR2A1614PN	14-pin VTR Connector
CN106	YWTCS7848101	4-pin VHS Connector
CN107	YFDJ210N200	20-pin Lens Connector
CN110	YF69346104	10-pin Connector
CN111	YFXC5B1431	14-pin Connector
E102	YWF15FJ2A	Flexible Board
E103	YWF15FJ3B	Flexible Board
E104	YWF15FJ4A	Flexible Board
E105	YWF15FJ5A	Flexible Board
E106	YWF15FJ6A	Flexible Board
E109	YWF15FJ9A	Flexible Board
M1	YFV5GA0044A3	Body Cap
M2	YWVAKA0781AN	CCD Assy
M4	YWV2HA0824A4	Shield Parts
M5	YWV5EB0824A1	Left Side Cover
M6	YFV5EA0369A3	BF Control Cover
M7	YFV3CA0066A3	Mic Holder
M9	YWV2SA1597A4	Mounting Plate for Cover
M10	YWV5WB1066A4	Jack Panel
M12	YWV7QA2128A4	Main Label
M13	YWV2SB1598A4	Mounting Angle
M14	YWV5WA1085A4	Switch Panel
M15	YWV2SA1625A4	Mounting Angle
M16	YWV5EB0826A1	Connector Cover
M17	YFV4JA0122A4	Spring
M18	YFV4JA0123A4	Spring
M19	PU47613	Guide
M20	YWV5WB1068A4	VTR Video/DC Power Panel
M21	YFV5EA0368A3	Battery Cover
M22	YWV1HA0049A4	Pin
M23	YWV7PA0079A4	Badge
M26	YWV5EA0820A3	Cover
M27	YWV5EA0821A3	Cover
M28	YFV1FA0010A4	Nut Pleot
M29	YFV5MA0002B4	Shoe
M30	YWV4JA0306A4	Spring
M31	YWV1EA0182A4	Special Screw
M32	YWCC704WM07	Spring
M33	YWCC704FM02	Special Screw
M34	YWV2HA0823A4	Shield Parts
M35	YFV7SA0308A4	NO Label
M36	YWV2EA0148A2	Upper Guide
M37	YWV2EA0149A2	Bottom Guide
M38	YWV2KA0581A2	Chassis
M39 ⚠	YWV2KA0582A1	Main Chassis
M40	YWV2SA1599A4	Mounting Angle
M41	YFTM-96-N06	Blank Cap
M45	YWV5RA0267A4	SES Set Knob
M46	YFV5RA0070A4	Normal Slied Knob
M47	YWV5RA0266A4	Knob
M48	YWV5RA0268A4	Standby Knob
M49	YFV6JA0037A4	ATW Push Button
M50	YWV2FA0459A4	Cushion for Board
M51	YWV5RA0269A4	REC Knob
M52	YWV5EB0825A1	Right Side Cover
M53	YFV7MB0099A4	Safety Label
M54	YWV5WB1067A4	Operation Panel
M55	YWV5VA0061A4	Pad
M56	YWV6EB0119A3	Lid
M57	YWV7PA0078A4	Badge
M61	YWV2HA0825A3	Shield Parts
M62	YWCC500LB13	Washer
M63	YFV5GA0046A4	32-pin Connector Cap

SYNC BOARD

REF.NO.	PART NO.	DESCRIPTION	
PCB1 (NLA)	YWVKBF015E1B	Printed Circuit Board Assy	
IC1	NJM2904M	IC	
IC2	YWTC7S02FR	IC	
IC3	NJU74HC74M	IC	
IC4	MN4049BS	IC	
IC5	YWTC4S66FR	IC	
IC6	YWTC7S04F	IC	
IC7	YWMB87075A	IC	
IC8	YWTC7S08FR	IC	
IC9	YWTC4S81FR	IC	
IC11	HB40	IC	
IC12	NJU74HC74M	IC	
IC13	NJM319M	IC	
IC14	NJU74HC00M	IC	
Q1	2SB766-RS	Transistor	
Q2,3	2SC3931-CD	Transistor	
Q5,6	2SC3931-CD	Transistor	
Q8-13	2SC3931-CD	Transistor	
Q14	2SD1819-QRS	Transistor	
Q15	2SC3931-CD	Transistor	
Q16	2SA1532-CD	Transistor	
Q17	2SB1218-QRS	Transistor	
D1	MA141K	Diode	
D2,3	YWFC54M	Diode	
D4	MA141K	Diode	
D5	YWFC54M	Diode	
D6-10	MA141K	Diode	
D12	MA141K	Diode	
R1	YWR1220P562D	Metal	5.6K ohms
R2	YWR1220P512D	Metal	5.1K ohms
R3	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R4,5	YWR1220P512D	Metal	5.1K ohms
R6	ERJ3GEYJ221	Carbon	220 ohms 1/16W
R7	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R8	ERJ3GEYJ333	Carbon	33K ohms 1/16W
R9	ERJ3GEYJ564	Carbon	560K ohms 1/16W
R10	ERJ3GEYJ331	Carbon	330 ohms 1/16W
R11	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R12	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W
R13	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R14	ERJ3GEYJ564	Carbon	560K ohms 1/16W
R15	ERJ3GEYJ331	Carbon	330 ohms 1/16W
R16	ERJ3GEYJ183	Carbon	18K ohms 1/16W
R17,18	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R19	ERJ3GEYJ183	Carbon	18K ohms 1/16W
R20	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R21	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R22	ERJ3GEYJ113	Carbon	11K ohms 1/16W
R23	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R24	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R25	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R28	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R30	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R31	ERJ3GEYJ564	Carbon	560K ohms 1/16W
R32	ERJ3GEYJ331	Carbon	330 ohms 1/16W
R33	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R34	ERJ3GEYJ683	Carbon	68K ohms 1/16W
R35	ERJ3GEYJ753	Carbon	75K ohms 1/16W
R37	ERJ3GEYJ564	Carbon	560K ohms 1/16W
R38	ERJ3GEYJ331	Carbon	330 ohms 1/16W
R39	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R40	ERJ3GEYJ202	Carbon	2K ohms 1/16W
R41	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R42	ERJ3GEYJ202	Carbon	2K ohms 1/16W
R43,44	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R46	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R47	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R48-50	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R52	ERJ3GEYJ912	Carbon	9.1K ohms 1/16W
R53,54	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R57	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R58	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R59	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R60	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R61	ERJ3GEYJ433	Carbon	43K ohms 1/16W
R62	ERJ3GEYJ823	Carbon	82K ohms 1/16W
R63	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R64	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R65,66	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R67	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R68	ERJ3GEYJ333	Carbon	33K ohms 1/16W
R69	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R70	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R71	ERJ3GEYJ561	Carbon	560 ohms 1/16W
R72	ERJ3GEYJ822	Carbon	8.2K ohms 1/16W
R73	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R74	ERJ3GEYJ822	Carbon	8.2K ohms 1/16W
R75	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W
R76	ERJ3GEYJ561	Carbon	560 ohms 1/16W
R77	ERJ3GEYJ333	Carbon	33K ohms 1/16W
R78	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R79	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R80	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R81	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R82	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R83,84	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R95	ERJ3GEYJ333	Carbon	33K ohms 1/16W
R96	ERJ3GEYJ162	Carbon	1.6K ohms 1/16W
R97	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R98	ERJ3GEYJ333	Carbon	33K ohms 1/16W
R99	ERJ3GEYJ750	Carbon	75 ohms 1/16W
R100	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R101	ERJ3GEYJ623	Carbon	62K ohms 1/16W
R102	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R104	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R105	ERJ3GEYJ133	Carbon	13K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION
R106,107	ERJ3GEYJ103	Carbon 10K ohms 1/16W
R108	ERJ3GEYJ562	Carbon 5.6K ohms 1/16W
R109,110	ERJ3GEYJ103	Carbon 10K ohms 1/16W
R111	ERJ3GEYJ223	Carbon 22K ohms 1/16W
R112	ERJ3GEYJ333	Carbon 33K ohms 1/16W
R113	ERJ3GEYJ223	Carbon 22K ohms 1/16W
R114	ERJ3GEYJ621	Carbon 620 ohms 1/16W
R115	ERJ3GEYJ103	Carbon 10K ohms 1/16W
R116	ERJ3GEYJ471	Carbon 470 ohms 1/16W
R117,118	ERJ3GEYJ103	Carbon 10K ohms 1/16W
R120,121	ERJ3GEYJ102	Carbon 1K ohms 1/16W
R122	ERJ3GEYJ104	Carbon 100K ohms 1/16W
R123	ERJ3GEYJ332	Carbon 3.3K ohms 1/16W
R124	ERJ3GEYJ103	Carbon 10K ohms 1/16W
R125	ERJ3GEYJ472	Carbon 4.7K ohms 1/16W
R126	ERJ3GEYJ122	Carbon 1.2K ohms 1/16W
R127	ERJ3GEYJ271	Carbon 270 ohms 1/16W
R128	ERJ3GEYJ272	Carbon 2.7K ohms 1/16W
R129	ERJ3GEYJ220	Carbon 22 ohms 1/16W
R130	ERJ3GEYJ122	Carbon 1.2K ohms 1/16W
R131	ERJ3GEYJ333	Carbon 33K ohms 1/16W
VR1	EVML3GA00B23	Variable Resistor 2K ohms
VR2	EVND2AA00BS3	Variable Resistor 5K ohms
C1	ECEA0GKS470	Electrolytic 47 µF 4V
C2,3	ECEA0JKS470	Electrolytic 47 µF 6.3V (KA)
C4	YW5X102K5VB	Ceramic 1000 pF
C5	YW5CH100J5VB	Ceramic 10 pF
C6	YW5CH221J5VB	Ceramic 220 pF
C7	YW5CH100J5VB	Ceramic 10 pF
C8	ECSF1CE225	Tantalum 2.2 µF 16V
C9	YW5X102K5VB	Ceramic 1000 pF
C10	YW5CH221J5VB	Ceramic 220 pF
C11	YW5CH100J5VB	Ceramic 10 pF
C12	YW5X102K5VB	Ceramic 1000 pF
C13	YW5CH100J5VB	Ceramic 10 pF
C14	ECSF1AE106	Tantalum 10 µF 10V
C16,17	ECSF1AE475	Tantalum 4.7 µF 10V
C18	ECEA0JKS101	Electrolytic 100 µF 6.3V
C19	YW5X122K5VB	Ceramic 1200 pF
C21	YW5X102K5VB	Ceramic 1000 pF
C22	YW5CH270J5VB	Ceramic 27 pF
C23	ECEA0JKS101	Electrolytic 100 µF 6.3V
C24	YW5F104Z2VB	Ceramic 0.1 µF
C25,26	ECSF1AE475	Tantalum 4.7 µF 10V
C27	YW5CH100J5VB	Ceramic 10 pF
C28	YW5CH150J5VB	Ceramic 15 pF
C29	YW5CH221J5VB	Ceramic 220 pF
C30	ECSF1HE474	Tantalum 0.47 µF 50V
C31	YW5X102K5VB	Ceramic 1000 pF
C32	YW5CH101J5VB	Ceramic 100 pF
C33,34	YW5CH100J5VB	Ceramic 10 pF
C35	ECSF1AE106	Tantalum 10 µF 10V
C36	ECSF1AE475	Tantalum 4.7 µF 10V
C37	ECEA1AKS470	Electrolytic 47 µF 10V
C38	ECSF1AE475	Tantalum 4.7 µF 10V

REF.NO.	PART NO.	DESCRIPTION
C40-42	ECSF1AE475	Tantalum 4.7 µF 10V
C43-45	YW5CH181J5VB	Ceramic 180 pF
C48	YW5X122K5VB	Ceramic 1200 pF
C49,50	ECSF1AE475	Tantalum 4.7 µF 10V
C51	YW5X103K2VB	Ceramic 0.01 µF
C52	ECSF1AE475	Tantalum 4.7 µF 10V
C53	ECST1VY224	Tantalum 0.22 µF 35V
C54	ECSF1AE476	Tantalum 47 µF 10V
C57	YW5CH470J5VB	Ceramic 47 pF
C58	YW5CH100J5VB	Ceramic 10 pF
C59	YF400221CHJT	Ceramic 220 pF
C60	YW5CH121J5VB	Ceramic 120 pF
C61	ECST1AD226	Tantalum 22 µF 4V
C62	YF400101CHJT	Ceramic 100 pF
C63	YW5CH200J5VB	Ceramic 20 pF
C64	YW5X103K2VB	Ceramic 0.01 µF
C65	YW5X562K5VB	Ceramic 5600 pF
C70	ECEA1AKN470	Electrolytic 47 µF 10V
C71	ECEA1AS470	Electrolytic 47 µF 10V
C72	ECEA1AKA220	Electrolytic 22 µF 10V
C73	ECEA0JKS101	Electrolytic 100 µF 6.3V
C74	ECEA1CKA100	Electrolytic 10 µF 16V
C75	ECEA0JU471	Electrolytic 470 µF 6.3V
C76	ECEA1HKS010	Electrolytic 1 µF 50V
C77	ECST1AC106ZR	Tantalum 10 µF 10V
C78	ECEA0JKS470	Electrolytic 47 µF 6.3V (KA)
C79	ECST0JC106	Tantalum 10 µF 6.3V
C80	YW5F104Z2VB	Ceramic 0.1 µF
C81	ECST1AD226	Electrolytic 22 µF 4V
C82,83	YW5CH100J5VB	Ceramic 10 pF
C85	YW5CH330J5VB	Ceramic 33 pF
CT1-3	TZ03R200YR1	Trimmer Capacitor 20pF
L1	EIS7EN029B	Coil
L2-4	ELJFA8R2MF	Coil 8.2 µH
L5	EIC5EB005A	Coil
L6-12	ELJFA8R2MF	Coil 8.2 µH
X1	YWSC1406VC0A	Crystal Oscillator
X2	YWSC1773VC0A	Crystal Oscillator
X3	YWSC1773INTA	Crystal Oscillator
CN1	YW530202010	Connector
CN2	YW530203010	Connector
J29	ERJ3GEY0R00	Jamper
E1-7	YW32BM5A	Terminal
M71	YWV2HA0817A4	Shield Cover A
M72	YWV2HA0818A4	Shield Case A

DRIVE BOARD

REF.NO.	PART NO.	DESCRIPTION	
PCB2 (NLA)	YWVKCF015E1B	Printed Circuit Board Assy	
IC2	YWCXD1251Q	IC	
IC3	YWCXA1337Q	IC	
IC4	MN74HCU04S	IC	
IC5	NJM3414M	IC	
IC6	NJM2904M	IC	
IC7	MN4532BS	IC	
IC8	YWCXD1149Q	IC	
IC9	YWTC7S32FR	IC	
IC10	MN53010LVN	IC	
IC11	MN74HC4066S	IC	
IC13	NJM3414M	IC	
IC16	NJM2904M	IC	
IC17,18	YWTC7S32FR	IC	
IC19	YWTC4S81FR	IC	
Q1	2SB1219-QRS	Transistor	
Q3	2SB1218-QRS	Transistor	
Q4	2SC3931-CD	Transistor	
Q5	2SD1819-QRS	Transistor	
Q7	2SB1218-QRS	Transistor	
Q8	2SD1819-QRS	Transistor	
Q9	2SB1218-QRS	Transistor	
Q10	2SD1819-QRS	Transistor	
Q11	2SB1218-QRS	Transistor	
Q12	2SD1030-T	Transistor	
Q13	2SK662-PQR	FET	
Q14	2SC3931-CD	Transistor	
Q15,16	2SB1218-QRS	Transistor	
Q17	2SK662-PQR	FET	
Q18	2SD1819-QRS	Transistor	
Q23,24	2SD1820-QRS	Transistor	
Q27	2SD1819-QRS	Transistor	
Q28-31	2SB970-QRS	Transistor	
Q32	2SD1819-QRS	Transistor	
D1	MA141K	Diode	
D2,3	1SV153	Diode	
D4-7	MA141K	Diode	
R1	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R3,4	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R5	ERJ3GEYJ220	Carbon	22 ohms 1/16W
R6	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R7	ERJ3GEYJ220	Carbon	22 ohms 1/16W
R14	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R15	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R16	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R17-19	ERJ3GEYJ220	Carbon	22 ohms 1/16W
R23	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R24	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R25	ERJ3GEYJ302	Carbon	3K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R32	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R33	ERJ3GEYJ154	Carbon	150K ohms 1/16W
R34	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R35	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R36	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R26	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R28	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R29	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R30	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R31	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R37	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W
R38	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R39,41	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R43	ERJ3GEYJ182	Carbon	1.8K ohms 1/16W
R44	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R45	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R46	ERJ3GEYJ242	Carbon	2.4K ohms 1/16W
R47	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R48	ERJ3GEYJ473	Carbon	47K ohms 1/16W
R49	ERJ3GEYJ202	Carbon	2K ohms 1/16W
R50	ERJ3GEYJ392	Carbon	3.9K ohms 1/16W
R51,52	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R53	ERJ3GEYJ203	Carbon	20K ohms 1/16W
R54	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R55	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R56	ERJ3GEYJ221	Carbon	220 ohms 1/16W
R57	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R59	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R60	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R61	ERJ3GEYJ151	Carbon	150 ohms 1/16W
R62	ERJ3GEYJ393	Carbon	39K ohms 1/16W
R63	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R64	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R65	ERJ3GEYJ203	Carbon	20K ohms 1/16W
R66	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R70	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R71	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R72	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R73	ERJ3GEYJ471	Carbon	470 ohms 1/16W
R74	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R75	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R76	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R77	ERJ3GEYJ513	Carbon	51K ohms 1/16W
R78	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R79	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R80	ERJ3GEYJ163	Carbon	16K ohms 1/16W
R81	ERJ3GEYJ124	Carbon	120K ohms 1/16W
R82,83	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R84	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R85	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R86	ERJ3GEYJ182	Carbon	1.8K ohms 1/16W
R87	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R89	ERJ3GEYJ105	Carbon	1M ohms 1/16W
R92,93	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R94,95	ERJ3GEYJ104	Carbon	100K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R96,97	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R98,99	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R100	ERJ3GEYJ123	Carbon	12K ohms 1/16W
R101	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R102	ERJ3GEYJ220	Carbon	22 ohms 1/16W
R103,104	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R105-109	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R110	ERJ3GEYJ330	Carbon	33 ohms 1/16W
R111	ERJ3GEYJ471	Carbon	470 ohms 1/16W
R112,113	ERJ3GEYJ470	Carbon	47 ohms 1/16W
R114,115	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R116	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R117	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R118	ERJ3GEYJ220	Carbon	22 ohms 1/16W
R122,123	ERJ3GEYJ221	Carbon	220 ohms 1/16W
R124,125	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R126	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R127,128	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R131	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R132	ERJ3GEYJ105	Carbon	1M ohms 1/16W
R133	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R135-138	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R139	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R140	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R143	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R144	ERJ3GEYJ183	Carbon	18K ohms 1/16W
R145	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R146	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R147	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R148	ERJ3GEYJ105	Carbon	1M ohms 1/16W
R149	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R151,152	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R153-155	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R156	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R157,158	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R174	ERJ3GEYJ105	Carbon	1M ohms 1/16W
R175	ERJ3GEYJ183	Carbon	18K ohms 1/16W
R176	ERJ3GEYJ683	Carbon	68K ohms 1/16W
R177	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R178	ERJ3GEYJ512	Carbon	5.1K ohms 1/16W
R179	ERJ3GEYJ473	Carbon	47K ohms 1/16W
R190	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R191	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R192,193	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R194	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R198	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R199	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R200	YWR1220P153D	Metal	15K ohms
R201	YWR1220P103D	Metal	10K ohms
R202	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R203	YWR1220P103D	Metal	10K ohms
R204	YFR1220P203D	Metal	20K ohms
R205	YWR1220P153D	Metal	15K ohms
R206	YWR1220P103D	Metal	10K ohms
R207	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R208	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R209	YWR1220P912D	Metal	9.2K ohms
R210	YWR1220P163D	Metal	16K ohms
R211	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R212	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R213	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R214	YWR1220P153D	Metal	15K ohms
R215	YWR1220P103D	Metal	10K ohms
R216,217	ERJ3GEYJ220	Carbon	22 ohms 1/16W
R218	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R220	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R221	ERJ3GEYJ105	Carbon	1M ohms 1/16W
R222	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R223	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R224	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R225	ERJ3GEYJ333	Carbon	33K ohms 1/16W
R226	ERJ3GEYJ473	Carbon	47K ohms 1/16W
R227	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R228	ERJ3GEYJ303	Carbon	30K ohms 1/16W
VR1,2	EVML1GA00B24	Variable Resistor	20K ohms
VR3	EVML1GA00B14	Variable Resistor	10K ohms
VR4	EVML1GA00B24	Variable Resistor	20K ohms
VR5	EVML1GA00BQ4	Variable Resistor	
C1	YW5CH101J5VB	Ceramic	100 pF
C2	YW5X103K2VB	Ceramic	0.01 µF
C3	ECEA0JKS101	Electrolytic	100 µF 6.3V
C4	ECST1AD476ZR	Tantalum	47 µF 10V
C7	YW5F104Z2VB	Ceramic	0.1 µF
C8	ECST1AD476ZR	Tantalum	47 µF 10V
C9-12	YW5F104Z2VB	Ceramic	0.1 µF
C13	ECST1AX475ZR	Tantalum	4.7 µF 10V
C13-15	YW5F104Z2VB	Ceramic	0.1 µF
C16	ECSF1CE105	Tantalum	1 µF 16V
C17	ECST1AD476ZR	Tantalum	47 µF 10V
C18	YW5CH101J5VB	Ceramic	100 pF
C20	YW5CH680J5VB	Ceramic	68 pF
C21	ECEA0GKS330	Electrolytic	33 µF 4V
C22	YW5CH121J5VB	Ceramic	120 pF
C23,24	YW5F104Z2VB	Ceramic	0.1 µF
C25	ECSF0JE106	Tantalum	10 µF 6.3V
C27	ECEA1EK3R3	Electrolytic	3.3 µF 25V
C28	YW5F104Z2VB	Ceramic	0.1 µF
C29	ECEA1CKA100	Electrolytic	10µF 16V
C30	YW5F104Z2VB	Ceramic	0.1 µF
C31	ECEA1AKS470	Electrolytic	47 µF 10V
C32	YW5F473Z2VB	Ceramic	0.047 µF
C33	ECST0GD476	Tantalum	47 µF 4V
C34	YW400474FZ	Ceramic	0.47 µF
C35	YW5X102K5VB	Ceramic	1000 pF
C37	YW5F104Z2VB	Ceramic	0.1 µF
C40	YW5CH470J5VB	Ceramic	47 pF
C41,42	YW5CH150J5VB	Ceramic	15 pF
C43	ECST1AD476ZR	Tantalum	47 µF 10V
C44-48	YW5CH510J5VB	Ceramic	51 pF

REF.NO.	PART NO.	DESCRIPTION
C50	YW5X103K2VB	Ceramic 0.01 μF
C51	ECST1AD476ZR	Tantalum 47 μF 10V
C52,53	YW5X103K2VB	Ceramic 0.01 μF
C54	ECST1AD226	Tantalum 22 μF 4V
C55	YW5X103K2VB	Ceramic 0.01 μF
C56	YW5F104Z2VB	Ceramic 0.1 μF
C57	YW5X103K2VB	Ceramic 0.01 μF
C58	YW5CH270J5VB	Ceramic 27 pF
C60	ECEA0JKS470	Electrolytic 47μF 6.3V (KA)
C61,62	YW5CH200J5VB	Ceramic 20 pF
C63	ECST1AD476ZR	Tantalum 47 μF 10V
C64	YW5CH330J5VB	Ceramic 33 pF
C66	ECEA0JKS330	Electrolytic 33 μF 6.3V
C70	YW5F104Z2VB	Ceramic 0.1 μF
C71	ECST1AD226	Tantalum 22 μF 4V
C72	ECSF1AE106	Tantalum 10 μF 10V
C73	ECST1CD336	Tantalum 33μF 16V
C79-82	YW5F104Z2VB	Ceramic 0.1 μF
C83-85	ECEA0JKS470	Electrolytic 47μF 6.3V (KA)
C86	ECEA1VKA220	Electrolytic 22 μF 35V
C87	ECEA1CKS470	Electrolytic 47μF 16V
C88	ECEA1AKS470	Electrolytic 47 μF 10V
C90,91	YW5CH270J5VB	Ceramic 27 pF
C92	YW5CH050D5VB	Ceramic 5 pF
C93,94	ECSF1AE226	Tantalum 22 μF 10V
C95	ECEA0JKS101	Electrolytic 100 μF 6.3V
L1	ELJFA8R2MF	Coil 8.2 μH
L3-5	ELJFA8R2MF	Coil 8.2 μH
L6	ELJFAR47MF	Coil 0.47 μH
L7-9	ELJFA8R2MF	Coil 8.2 μH
L10	ELEXH1R0KA	Coil 1 μH
L11	YWYD9381	Coil
L12,13	ELJFA8R2MF	Coil 8.2 μH
CN1	YW530201010	10-pin Connector
CN2	YW530203010	30-pin Connector
CN3	YW559718APB	18-pin Connector
CN4	EMCS0250Z	2-pin Connector
J9,10	ERJ3GEY0R00	Jumper Resistor
J13,119	ERJ3GEY0R00	Jumper Resistor
J134,141	ERJ3GEY0R00	Jumper Resistor
J150,195	ERJ3GEY0R00	Jumper Resistor
J1229	ERJ3GEY0R00	Jumper Resistor
TP1	YW32BM5A	Test-pin
M73	YWV2HA0813A4	Shield Cover B
M74	YWV2HA0814A4	Shield Case B

REF.NO.	PART NO.	DESCRIPTION
PROCESS BOARD		
PCB3 (NLA)	YWVKBF015E2A	Printed Circuit Board Assy
IC1,2	NJM2904M	IC
IC3	NJM2901M	IC
IC4	YWNJU4053M	IC
IC5	YWHA11776AMP	IC
IC6	AN608P	IC
IC7	YWNJU4053M	IC
IC8	NJM3414M	IC
IC9	AN2210S	IC
Q1,2	2SC3931-CD	Transistor
Q3-5	2SB1218-QRS	Transistor
Q6-8	2SC3931-CD	Transistor
Q9	2SD1819-QRS	Transistor
Q10-12	2SC3931-CD	Transistor
Q13	2SD1819-QRS	Transistor
Q14	2SA1532-CD	Transistor
Q15	2SC3931-CD	Transistor
Q16	2SD1819-QRS	Transistor
Q17	2SC3931-CD	Transistor
Q18	2SA1532-CD	Transistor
Q19,20	2SD1819-QRS	Transistor
Q21	2SC3931-CD	Transistor
Q22	2SB1218-QRS	Transistor
Q23,24	2SD1819-QRS	Transistor
Q25	2SB1218-QRS	Transistor
Q26-31	2SD1819-QRS	Transistor
Q35	2SA838-CD	Transistor
	2SB1218-QRS	Transistor
Q36-38	2SD1819-QRS	Transistor
Q39	2SB1218-QRS	Transistor
Q40-42	2SD1819-QRS	Transistor
Q43-45	2SB1218-QRS	Transistor
Q48-50	2SD1819-QRS	Transistor
Q51	2SC3931-CD	Transistor
Q52-55	2SD1819-QRS	Transistor
Q62	2SB1218-QRS	Transistor
Q63-66	2SD1819-QRS	Transistor
Q67,68	2SC3931-CD	Transistor
Q69	2SB1218-QRS	Transistor
Q70-73	2SD1819-QRS	Transistor
Q74	2SB1218-QRS	Transistor
Q75	2SA1532-CD	Transistor
Q76	2SB1218-QRS	Transistor
Q77-79	2SD1819-QRS	Transistor
Q80,81	2SC3931-CD	Transistor
Q82	2SB1218-QRS	Transistor
Q83	2SD1819-QRS	Transistor
Q84	2SC3931-CD	Transistor
Q85	2SA1532-CD	Transistor
Q87	2SD1819-QRS	Transistor
Q88	2SB1218-QRS	Transistor

REF.NO.	PART NO.	DESCRIPTION	
Q89	2SC3931-CD	Transistor	
Q90	2SD1819-QRS	Transistor	
D2	MA141K	Diode	
D3,4	1SS108	Diode	
D6	MA141WA	Diode	
R1	ERJ3GEYJ363	Carbon	36K ohms 1/16W
R2	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R3,4	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R5,6	ERJ3GEYJ912	Carbon	9.1K ohms 1/16W
R7	ERJ3GEYJ363	Carbon	36K ohms 1/16W
R8	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R9	ERJ3GEYJ203	Carbon	20K ohms 1/16W
R10	ERJ3GEYJ203	Carbon	20K ohms 1/16W
R11,12	ERJ3GEYJ133	Carbon	13K ohms 1/16W
R13	ERJ3GEYJ333	Carbon	33K ohms 1/16W
R14	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R15-18	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R19	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R20	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R21	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R22	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R23	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R24	ERJ3GEYJ561	Carbon	560 ohms 1/16W
R25	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R26	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R27	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R28	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R30	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R32	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R33	ERJ3GEYJ471	Carbon	470 ohms 1/16W
R34	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R35	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R36	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R37	ERJ3GEYJ132	Carbon	1.3K ohms 1/16W
R38-42	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R43	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R44-46	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R47	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R48	ERJ3GEYJ182	Carbon	1.8K ohms 1/16W
R49	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R50	ERJ3GEYJ151	Carbon	150 ohms 1/16W
R51	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R52	ERJ3GEYJ561	Carbon	560 ohms 1/16W
R53	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R54-56	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R57	ERJ3GEYJ512	Carbon	5.1K ohms 1/16W
R58,59	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R60	ERJ3GEYJ331	Carbon	330 ohms 1/16W
R61	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R62	ERJ3GEYJ122	Carbon	1.2K ohms 1/16W
R63	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R64,65	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R66	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R67	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R68	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R69	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R70	ERJ3GEYJ680	Carbon	68 ohms 1/16W
R71	ERJ3GEYJ271	Carbon	270 ohms 1/16W
R72	ERJ3GEYJ392	Carbon	3.9K ohms 1/16W
R73	ERJ3GEYJ271	Carbon	270 ohms 1/16W
R74,75	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R76	ERJ3GEYJ680	Carbon	68 ohms 1/16W
R77	ERJ3GEYJ183	Carbon	18K ohms 1/16W
R78	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R79	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R80	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R81	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R82	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R83	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W
R84	ERJ3GEYJ680	Carbon	68 ohms 1/16W
R85	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R86	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W
R87,88	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R89	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R90	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R92	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R93	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R94	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R95	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R96	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R97	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R98	ERJ3GEYJ680	Carbon	68 ohms 1/16W
R99	ERJ3GEYJ123	Carbon	12K ohms 1/16W
R100	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R101	ERJ3GEYJ221	Carbon	220 ohms 1/16W
R102	ERJ3GEYJ181	Carbon	180 ohms 1/16W
R103	ERJ3GEYJ750	Carbon	75 ohms 1/16W
R104	ERJ3GEYJ680	Carbon	68 ohms 1/16W
R105	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R106	ERJ3GEYJ680	Carbon	68 ohms 1/16W
R107	ERJ3GEYJ123	Carbon	12K ohms 1/16W
R108	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R109	ERJ3GEYJ181	Carbon	180 ohms 1/16W
R110	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R111	ERJ3GEYJ750	Carbon	75 ohms 1/16W
R112,113	ERJ3GEYJ333	Carbon	33K ohms 1/16W
R114	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R115	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R116	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R117	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R118	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R119	ERJ3GEYJ680	Carbon	68 ohms 1/16W
R120	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R121	ERJ3GEYJ122	Carbon	1.2K ohms 1/16W
R122	ERJ3GEYJ392	Carbon	3.9K ohms 1/16W
R123	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W
R126	ERJ3GEYJ750	Carbon	75 ohms 1/16W
R134,135	ERJ3GEYJ183	Carbon	18K ohms 1/16W
R136	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R137	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R138	ERJ3GEYJ680	Carbon	68 ohms 1/16W
R139	ERJ3GEYJ123	Carbon	12K ohms 1/16W
R140	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R141	ERJ3GEYJ221	Carbon	220 ohms 1/16W
R142	ERJ3GEYJ181	Carbon	180 ohms 1/16W
R143	ERJ3GEYJ183	Carbon	18K ohms 1/16W
R145	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R146	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R147	ERJ3GEYJ182	Carbon	1.8K ohms 1/16W
R148	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R149	ERJ3GEYJ751	Carbon	750 ohms 1/16W
R150	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R151	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R152	ERJ3GEYJ680	Carbon	68 ohms 1/16W
R153	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R154	ERJ3GEYJ122	Carbon	1.2K ohms 1/16W
R155	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R156	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W
R157,158	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R159	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R160	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R161	ERJ3GEYJ680	Carbon	68 ohms 1/16W
R162,163	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R163	ERJ3GEYJ123	Carbon	12K ohms 1/16W
R164	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R165	ERJ3GEYJ181	Carbon	180 ohms 1/16W
R166	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R167	ERJ3GEYJ750	Carbon	75 ohms 1/16W
R168	ERJ3GEYJ680	Carbon	68 ohms 1/16W
R169	ERJ3GEYJ681	Carbon	680 ohms 1/16W
R170	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R171	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R172	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R173	ERJ3GEYJ680	Carbon	68 ohms 1/16W
R174	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R175	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R176	ERJ3GEYJ122	Carbon	1.2K ohms 1/16W
R177	ERJ3GEYJ392	Carbon	3.9K ohms 1/16W
R178	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W
R179	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R180	ERJ3GEYJ112	Carbon	1.1K ohms 1/16W
R181	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R182	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R183	ERJ3GEYJ751	Carbon	750 ohms 1/16W
R184	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R185	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R186	ERJ3GEYJ680	Carbon	68 ohms 1/16W
R187	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R188	ERJ3GEYJ122	Carbon	1.2K ohms 1/16W
R189	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R190	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W
R201	ERJ3GEYJ392	Carbon	3.9K ohms 1/16W
R207	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R208,209	ERJ3GEYJ223	Carbon	22K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R210	ERJ3GEYJ680	Carbon	68 ohms 1/16W
R211	ERJ3GEYJ123	Carbon	12K ohms 1/16W
R212	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R213	ERJ3GEYJ181	Carbon	180 ohms 1/16W
R214	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R215	ERJ3GEYJ183	Carbon	18K ohms 1/16W
R217	ERJ3GEYJ750	Carbon	75 ohms 1/16W
R218	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R219	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R220	ERJ3GEYJ752	Carbon	7.5K ohms 1/16W
R221	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R222	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R223	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R224	ERJ3GEYJ392	Carbon	3.9K ohms 1/16W
R225	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R226	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R227	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R228	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R229-231	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R230	ERJ3GEYJ512	Carbon	5.1K ohms 1/16W
R231	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R232	ERJ3GEYJ913	Carbon	91K ohms 1/16W
R233,234	ERJ3GEYJ473	Carbon	47K ohms 1/16W
R235	ERJ3GEYJ334	Carbon	330K 1/16W
R236-238	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R239,240	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R241	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R242	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R243	ERJ3GEYJ684	Carbon	680K ohms 1/16W
R244	ERJ3GEYJ392	Carbon	3.9K ohms 1/16W
R245	ERJ3GEYJ512	Carbon	5.1K ohms 1/16W
R246	ERJ3GEYJ132	Carbon	1.3K ohms 1/16W
R247	ERJ3GEYJ302	Carbon	3K ohms 1/16W
R248	ERJ3GEYJ471	Carbon	470 ohms 1/16W
R249	ERJ3GEYJ680	Carbon	68 ohms 1/16W
R250,251	ERJ3GEYJ392	Carbon	3.9K ohms 1/16W
R252,253	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R254	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R255,256	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R257	ERJ3GEYJ202	Carbon	2K ohms 1/16W
R258	ERJ3GEYJ151	Carbon	150 ohms 1/16W
R259	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R260	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R262	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R263	ERJ3GEYJ132	Carbon	1.3K ohms 1/16W
R264	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R265	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W
R266	ERJ3GEYJ822	Carbon	8.2K ohms 1/16W
R267	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R268,269	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R270	ERJ3GEYJ392	Carbon	3.9K ohms 1/16W
R271	ERJ3GEYJ132	Carbon	1.3K ohms 1/16W
R272	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R273	ERJ3GEYJ302	Carbon	3K ohms 1/16W
R274	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R275	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R276	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R277	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R278	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R279	ERJ3GEYJ123	Carbon	12K ohms 1/16W
R281	ERJ3GEYJ391	Carbon	390 ohms 1/16W
R282	ERJ3GEYJ393	Carbon	39K ohms 1/16W
R283	LP163K3G222	Metal	2.2K ohms
R285	YWR1220P753D	Metal	75K ohms
R286	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R287	YWR1220P103D	Metal	10K ohms
R288	ERJ3GEYJ153	Carbon	15K ohms 1/16W
VR1,2	EVML1GA00BE4	Variable Resistor	
VR3	EVML1GA00B54	Variable Resistor	50K ohms or
	EVML3GA00B54	Variable Resistor	50K ohms
VR4	EVML1GA00B54	Variable Resistor	50K ohms or
	EVML3GA00B54	Variable Resistor	50K ohms
VR5-7	EVML1GA00B13	Variable Resistor	1K ohms
VR8	EVML1GA00BQ3	Variable Resistor	
VR9	RH0422C4R7K	Variable Resistor	4.7K ohms
VR10	EVML1GA00BQ2	Variable Resistor	
C1	YW5F104Z2VB	Ceramic	0.1 µF
C2,3	ECEA0GKK220	Electrolytic	22 µF 4V
C4	ECEA0JS470	Electrolytic	47 µF 6.3V
C5	ECST0JY225ZR	Tantalum	2.2 µF 6.3V
C6	YW5CH181J5VB	Ceramic	180 pF
C7	YW5X103K2VB	Ceramic	0.01 µF
C8	YW5CH220J5VB	Ceramic	22 pF
C9	YW5X103K2VB	Ceramic	0.01 µF
C10	ECSF1AE476	Tantalum	47 µF 10V
C11	YW5CH470J5VB	Ceramic	47 pF
C12,13	YW5X103K2VB	Ceramic	0.01 µF
C14	YW5CH680J5VB	Ceramic	68 pF
C15	YW5F104Z2VB	Ceramic	0.1 µF
C16	YW5X103K2VB	Ceramic	0.01 µF
C17	YW5CH050D5VB	Ceramic	5 pF
C18	YW5X103K2VB	Ceramic	0.01 µF
C19	YW5F104Z2VB	Ceramic	0.1 µF
C20	YW5X103K2VB	Ceramic	0.01 µF
C21	ECEA1CKS100	Electrolytic	10 µF 16V
C22	YW5F104Z2VB	Ceramic	0.1 µF
C23	YW5CH300J5VB	Ceramic	30 pF
C24-26	YW5F473Z2VB	Ceramic	0.047 µF
C27	ECST0JY225ZR	Tantalum	2.2 µF 10V
C28	YW5X222K5VB	Ceramic	2200 pF
C29	YW5F104Z2VB	Ceramic	0.1 µF
C30	YW5CH560J5VB	Ceramic	56 pF
C31	ECEA0JS470	Electrolytic	47 µF 6.3V
C32	YW5CH220J5VB	Ceramic	22 pF
C33,34	YW5X103K2VB	Ceramic	0.01 µF
C35	YW5CH470J5VB	Ceramic	47 pF
C36	ECEA1CKS100	Electrolytic	10F 16V
C37	ECST1AY225ZR	Tantalum	2.2 µF 10V
C38	ECEA1CKS100	Electrolytic	10 µF 16V
C40	ECSF1AE686	Tantalum	68 µF 10V
C41	YW5F104Z2VB	Ceramic	0.1 µF
C42	ECEA1CKS100	Electrolytic	10µF 16V
C43	ECEA0JS470	Electrolytic	47 µF 6.3V
C44	ECEA1AKA101	Electrolytic	100µF 10V
C45	YW5X103K2VB	Ceramic	0.01 µF
C46	ECEA1AU471	Electrolytic	470µF 10V
C47	ECEA0GKS101	Electrolytic	100 µF 4V
C52	YW5X103K2VB	Ceramic	0.01 µF
C53	YW5F104Z2VB	Ceramic	0.1 µF
C54	ECST0JY225ZR	Tantalum	2.2 µF 6.3V
C55	YW5CH220J5VB	Ceramic	22 pF
C56	YW5F104Z2VB	Ceramic	0.1 µF
C57	ECEA0JS470	Electrolytic	47 µF 6.3V
C58	ECEA1AU471	Electrolytic	470µF 10V
C59	ECST1CY105ZR	Tantalum	1 µF 16V
C60	YW5CH220J5VB	Ceramic	22 pF
C61	ECEA0GKS101	Electrolytic	100 µF 4V
C62	YW5CH680J5VB	Ceramic	68 pF
C63	ECST1CY105ZR	Tantalum	1 µF 16V
C65	ECEA0JS470	Electrolytic	47 µF 6.3V
C66	ECEA1CKS100	Electrolytic	10µF 16V
C67	ECEA1AU471	Electrolytic	470µF 10V
C68	ECEA0JS470	Electrolytic	47 µF 6.3V
C69,70	YW5CH470J5VB	Ceramic	47 pF
C71	ECEA0JKS101	Electrolytic	100µF 6.3V
C72	ECST1AY225ZR	Tantalum	2.2 µF 6.3V
C73	YW5CH470J5VB	Ceramic	47 pF
C74	YW5X271K2VB	Ceramic	270 pF
C75	YW5CH220J5VB	Ceramic	22 pF
C76	YW5X681K5VB	Ceramic	680 pF
C77	YW5X102K5VB	Ceramic	1000 pF
C78	YW5F104Z2VB	Ceramic	0.1 µF
C79,80	ECST0JY225ZR	Tantalum	2.2 µF 6.3V
C81	YW5F104Z2VB	Ceramic	0.1 F
C82	ECST1CY105ZR	Tantalum	1 µF 16V
C84	ECEA0GKS470	Electrolytic	47 F 4V
C86	YW5CH180J5VB	Ceramic	18 pF
C87	YW5CH050D5VB	Ceramic	5 pF
C88	YW5CH470J5VB	Ceramic	47 pF
C89	YW5CH220J5VB	Ceramic	22 pF
C90	YW5X222K5VB	Ceramic	2200 pF
C91,92	YW5X103K2VB	Ceramic	0.01 pF
L1	ELJFA560KF	Coil	56 µH
L2	YFF3216E8R2K	Coil	8.2 µH
L3	ELJFA560KF	Coil	56 µH
L5	ELJFA8R2MF	Coil	8.2 µH
L6,7	ELJFA560KF	Coil	56 µH
L8	YFF3216E8R2K	Coil	8.2 µH
SW1	YFSSS222YK	Slide Switch	
CF1	ELB4C033	Filter	
CF2	YWELB4P030	Filter	
CN1,2	YW530203010	Connector	
CN3	PS10SDD4TS11	10-pin Connector	
CN4	PS26SDD4TS11	26-pin Connector	
J261	ERJ3GEY0R00	Jumper Resistor	
J289	ERJ8GEY0R00	Jumper Resistor	

PROCESS SUB BOARD

REF.NO.	PART NO.	DESCRIPTION	
PCB4 (NLA)	YWVKCF015E2A	Printed Circuit Board Assy	
IC1	YWCXA1338Q	IC	
IC2	YWNJU4053M	IC	
IC3	YWCXA1339Q	IC	
IC4	YWHB85A	IC	
IC5	YWNJM2240M	IC	
IC6,7	YWHB80	IC	
IC8	YWNJM2228M	IC	
IC9	NJM3414M	IC	
Q1	2SB1218-QRS	Transistor	
Q2,3	2SD1819-QRS	Transistor	
Q4,5	2SC3931-CD	Transistor	
Q6	2SB1218-QRS	Transistor	
Q7	2SD1819-QRS	Transistor	
Q8	2SC3931-CD	Transistor	
Q9	2SB1218-QRS	Transistor	
Q10	2SD1819-QRS	Transistor	
Q11	2SC3931-CD	Transistor	
Q12-14	2SD1819-QRS	Transistor	
Q16	2SB1218-QRS	Transistor	
Q17-19	2SD1819-QRS	Transistor	
Q20	2SB1218-QRS	Transistor	
Q21-23	2SD1819-QRS	Transistor	
Q24	2SB1218-QRS	Transistor	
Q25	2SD1819-QRS	Transistor	
Q26	2SB1218-QRS	Transistor	
Q27	2SC3931-CD	Transistor	
Q28,29	2SB1218-QRS	Transistor	
Q30,31	2SD1819-QRS	Transistor	
R1	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R2	ERJ3GEYJ751	Carbon	750 ohms 1/16W
R3	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R4	YW2116822GT	Carbon	8.2K ohms 1/16W
R5	YF2116272GT	Carbon	2.7K ohms 1/16W
R6	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R7	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R8	ERJ3GEYJ123	Carbon	12K ohms 1/16W
R9	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R10	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R12,13	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R14	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R15	L311F102G502	Carbon	5K ohms 1/16W
R16	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R17	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R18	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W
R19	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R20	ERJ3GEYJ203	Carbon	20K ohms 1/16W
R21	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R22	ERJ3GEYJ331	Carbon	330 ohms 1/16W
R23	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R24	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R25	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R26	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R27	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R28	ERJ3GEYJ391	Carbon	390 ohms 1/16W
R29	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R30,31	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R32	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R33	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W
R34	ERJ3GEYJ122	Carbon	1.2K ohms 1/16W
R35	ERJ3GEYJ752	Carbon	7.5K ohms 1/16W
R36	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R37	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R38	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R39,40	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R41	ERJ3GEYJ123	Carbon	12K ohms 1/16W
R42	ERJ3GEYJ473	Carbon	47K ohms 1/16W
R43	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R44	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R45	ERJ3GEYJ622	Carbon	6.2K ohms 1/16W
R46	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R47	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R48	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W
R49	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R50	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R51	ERJ3GEYJ622	Carbon	6.2K ohms 1/16W
R52	ERJ3GEYJ392	Carbon	3.9K ohms 1/16W
R53	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W
R54	ERJ3GEYJ391	Carbon	390 ohms 1/16W
R55	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R56	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R57,58	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R59	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R60	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R61	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R62	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R63	YF2116392GT	Carbon	3.9K ohms 1/16W
R64	YF2116682GT	Carbon	6.8K ohms 1/16W
R65	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R66,67	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R68	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R69	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R70	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R71,72	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R73	ERJ3GEYJ154	Carbon	150K ohms 1/16W
R74	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R75	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W
R76	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R77,78	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W
R79	ERJ3GEYJ183	Carbon	18K ohms 1/16W
R81	ERJ3GEYJ682	Carbon	6.8K ohms 1/16W
R83	ERJ3GEYJ561	Carbon	560 ohms 1/16W
R84	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R85	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R86	ERJ3GEYJ122	Carbon	1.2K ohms 1/16W
R87	L311F182G502	Carbon	5K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R88	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R89	ERJ3GEYJ473	Carbon	47K ohms 1/16W
R90,91	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R92	ERJ3GEYJ561	Carbon	560 ohms 1/16W
R93	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R94	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R95	ERJ3GEYJ122	Carbon	1.2K ohms 1/16W
R96	L311F182G502	Carbon	5K ohms 1/16W
R97	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R98	ERJ3GEYJ473	Carbon	47K ohms 1/16W
R99	ERJ3GEYJ392	Carbon	3.9K ohms 1/16W
R100,101	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R102,103	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R104	ERJ3GEYJ182	Carbon	1.8K ohms 1/16W
R105	ERJ3GEYJ242	Carbon	2.4K ohms 1/16W
R106	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R107	YF2116123GT	Carbon	12K ohms 1/16W
R108	YF2116102GT	Carbon	1K ohms 1/16W
R109	YF2116332GT	Carbon	3.3K ohms 1/16W
R110	ERJ3GEYJ123	Carbon	12K ohms 1/16W
R111	ERJ3GEYJ362	Carbon	3.6K ohms 1/16W
R112,114	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R115	ERJ3GEYJ242	Carbon	2.4K ohms 1/16W
R116	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R117	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R119	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R120	ERJ3GEYJ183	Carbon	18K ohms 1/16W
R121,122	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R123	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R124	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R125	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R126	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R130	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R131	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R132	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R133	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R134	ERJ3GEYJ681	Carbon	680 ohms 1/16W
R135	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R136	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R137,138	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R139	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R140	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R141,142	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R143	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R144	ERJ3GEYJ241	Carbon	
R145,146	ERJ3GEYJ822	Carbon	8.2K ohms 1/16W
VR1-3	EVML1GA00B14	Variable Resistor	10K ohms
VR4	EVML1GA00B53	Variable Resistor	5K ohms
VR5,6	RH0422C4R7K	Variable Resistor	4.7K ohms
VR7	EVML1GA00B14	Variable Resistor	10K ohms
VR8-10	EVML1GA00BE4	Variable Resistor	
VR11	EVML1GA00B14	Variable Resistor	10K ohms
C1	ECSF1AE225	Tantalum	2.2 µF 10V
C2-14	YW5F104Z2VB	Ceramic	0.1 µF
C15	ECSF1AE476	Tantalum	47 µF 10V

REF.NO.	PART NO.	DESCRIPTION	
C16-20	YW5F104Z2VB	Ceramic	0.1 µF
C21	ECEA0GKS470	Electrolytic	47 µF 4V
C22	YW5F104Z2VB	Ceramic	0.1 µF
C23	ECSF1CE106	Tantalum	10 µF 16V
C24,25	ECSF1AE336	Tantalum	33 µF 10V
C26	YW5X102K5VB	Ceramic	1000 pF
C27	ECST0JY225ZR	Tantalum	2.2µF 6.3V
C28-30	YW5F104Z2VB	Ceramic	0.1 µF
C31	YW5X103K2VB	Ceramic	0.01 µF
C32	ECEA1EKK4R7	Electrolytic	4.7 µF 25V
C33	YW5X103K2VB	Ceramic	0.01 µF
C34	YW5X821K5VB	Ceramic	820 pF
C35	YW5CH050D5VB	Ceramic	5 pF
C36	YW5X103K2VB	Ceramic	0.01 µF
C37	ECEA0JS470	Electrolytic	47 µF 6.3V
C38,39	ECEA1AS470	Electrolytic	47 µF 10V
C40	ECEA1EKK4R7	Electrolytic	4.7 µF 25V
C41	YW5F104Z2VB	Ceramic	0.1 µF
C42	ECEA1EKK4R7	Electrolytic	4.7 µF 25V
C43	YW5F104Z2VB	Ceramic	0.1 µF
C44	ECEA1AS470	Electrolytic	47 µF 10V
C45	ECEA1EKK4R7	Electrolytic	4.7 µF 25V
C46	YW5F104Z2VB	Ceramic	0.1 µF
C47	ECEA1EKK4R7	Electrolytic	4.7 µF 25V
C48,49	YW5F104Z2VB	Ceramic	0.1 µF
C50	YW5X103K2VB	Ceramic	0.01 µF
C51	ECEA1EKK4R7	Electrolytic	4.7 µF 25V
C52	YW5X103K2VB	Ceramic	0.01 µF
C53	YW5X821K5VB	Ceramic	820 pF
C54	YW5CH150J5VB	Ceramic	
C55	YW5X103K2VB	Ceramic	0.01 µF
C56	YW5CH330J5VB	Ceramic	33 PF
C57	ECEA1AS470	Electrolytic	47 µF 10V
C58	ECEA0GKS470	Electrolytic	47 µF 4V
C59	ECEA1CKS100	Electrolytic	10 µF 16V
C60	ECSF1AE225		2.2 µF 10V
C61-64	YW5F104Z2VB	Ceramic	0.1 µF
C65-67	YW5X103K2VB	Ceramic	0.01 µF
C68-77	YW5F104Z2VB	Ceramic	0.1 µF
C78	ECEA0JS470	Electrolytic	47 µF 6.3V
C79	YW5X103K2VB	Ceramic	0.01 µF
C80	ECSF1AE225		2.2 µF 10V
C81	YW5F104Z2VB	Ceramic	0.1 µF
C82	ECST0JY225ZR	Electrolytic	
C83-87	YW5F104Z2VB	Ceramic	0.1 µF
C88	ECEA0JKS101	Electrolytic	100 µF 6.3V
C89	YW5F104Z2VB	Ceramic	0.1 µF
C90	ECEA0JKS470	Electrolytic	47 µF 6.3V
C91,93	ECEA1AKS220	Electrolytic	22 µF 10V
C94,95	ECEA1AKS220	Electrolytic	22 µF 10V
C96-98	ECST0JY225ZR	Electrolytic	
L1-9	YFF3216E8R2K	Coil	8.2 µH
CF1	ELB4E005	Filter	
CF2	YFELB4L033	Filter	
CF3	ELB4D026	Filter	

REF.NO.	PART NO.	DESCRIPTION
CF4-7	ELB4B067	Filter
CF8,9	ELB4B068	Filter
CF10	ELB4E028	Filter
CN1	AXL210901	10-pin Connector
CN2	AXL226901	26-pin Connector
M75	YWV2HA0815A4	Shield Cover C
M76	YWV2HA0816A4	Shield Case C

MICROPROCESSOR BOARD

REF.NO.	PART NO.	DESCRIPTION
PCB5 (NLA)	YWVKYF015E3A	Printed Circuit Board
IC1	M50450FP	IC
IC2	AN90B81S	IC
IC3	AN90B82S	IC
IC4	M51951AMLW	IC
IC5	NJM2904M	IC
IC6	YWNJU4051M	IC
IC7-9	NJM2902M	IC
IC10	MN17581CC02	IC
IC11	YWNJU4053M	IC
IC12	MN4066BS	IC
IC13	YWNJU4053M	IC
IC14	NJM2903M	IC
IC15	NJM2904M	IC
IC16,17	YWTC4S66FR	IC
Q1	2SD1819-QRS	Transistor
Q2	2SB1218-QRS	Transistor
Q3-5	2SD1819-QRS	Transistor
Q6	2SB970-QRS	Transistor
Q7-17	2SD1819-QRS	Transistor
Q18	2SB1218-QRS	Transistor
Q19-21	2SD1819-QRS	Transistor
Q22	2SD602-QRS	Transistor
Q23	2SB709-RS	Transistor
Q24,25	2SD1030-T	Transistor
Q26	2SC2404-CD	Transistor
Q27,28	2SD1030-T	Transistor
Q29	2SD1819-QRS	Transistor
Q30	2SD602-QRS	Transistor
Q32	XN6501	Transistor
Q33,34	XN6401	Transistor
Q35	XN6501	Transistor
Q36-39	2SD1819-QRS	Transistor
Q42,43	2SD1819-QRS	Transistor
D1-11	MA141K	Diode
D12	MA143	Diode
D16	HZ9LB-2	Diode
D17	MA141K	Diode
D18	HZ3BLL	Diode
D19	MA141K	Diode

REF.NO.	PART NO.	DESCRIPTION	
D20	MA123	Diode	
D21	MA141WK	Diode	
R1	ERJ3GEYJ823	Carbon	82K ohms 1/16W
R2-5	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R6	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R7	ERJ3GEYJ303	Carbon	30K ohms 1/16W
R8	ERJ3GEYJ333	Carbon	33K ohms 1/16W
R9,10	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R11	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R12	ERJ3GEYJ273	Carbon	27K ohms 1/16W
R13,14	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R15	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R16	ERJ3GEYJ391	Carbon	390 ohms 1/16W
R17	ERJ3GEYJ750	Carbon	75 ohms 1/16W
R18,19	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R20	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R21-23	ERJ3GEYJ823	Carbon	82K ohms 1/16W
R24-27	ERJ3GEYJ473	Carbon	47K ohms 1/16W
R28	ERJ3GEYJ823	Carbon	82K ohms 1/16W
R29,30	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R31,32	ERJ3GEYJ823	Carbon	82K ohms 1/16W
R33-35	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R36	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R37,38	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R39	ERJ3GEYJ750	Carbon	75 ohms 1/16W
R40	ERJ3GEYJ333	Carbon	33K ohms 1/16W
R41	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R42	ERJ3GEYJ151	Carbon	150 ohms 1/16W
R43	ERJ3GEYJ331	Carbon	330 ohms 1/16W
R44	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R45	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R46	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R47	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R48	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R49	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R50	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R51	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R52	ERJ3GEYJ750	Carbon	75 ohms 1/16W
R53	ERJ3GEYJ333	Carbon	33K ohms 1/16W
R54	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R55	ERJ3GEYJ151	Carbon	150 ohms 1/16W
R56	ERJ3GEYJ331	Carbon	330 ohms 1/16W
R57	ERJ3GEYJ272	Carbon	2.7K ohms 1/16W
R58	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R59	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R60	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R61	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R62	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R63,64	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R65	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R66	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R67	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R68	ERJ3GEYJ363	Carbon	36K ohms 1/16W
R69	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R70,71	ERJ3GEYJ223	Carbon	22K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION
R72	ERJ3GEYJ103	Carbon 10K ohms 1/16W	R159	ERJ3GEYJ123	Carbon 12K ohms 1/16W
R73	ERJ3GEYJ473	Carbon 47K ohms 1/16W	R160	ERJ3GEYJ333	Carbon 33K ohms 1/16W
R74	ERJ3GEYJ103	Carbon 10K ohms 1/16W	R161	ERJ3GEYJ123	Carbon 12K ohms 1/16W
R75,76	ERJ3GEYJ100	Carbon 10 ohms 1/16W	R162,163	ERJ3GEYJ102	Carbon 1K ohms 1/16W
R77	ERJ3GEYJ103	Carbon 10K ohms 1/16W	R164	ERJ3GEYJ683	Carbon 68K ohms 1/16W
R78	ERJ3GEYJ101	Carbon 100 ohms 1/16W	R165	ERJ3GEYJ123	Carbon 12K ohms 1/16W
R80	ERJ3GEYJ152	Carbon 1.5K ohms 1/16W	R166	ERJ3GEYJ472	Carbon 4.7K ohms 1/16W
R81	YW2116225GT	Carbon 2.2M ohms 1/16W	R167,168	ERJ3GEYJ473	Carbon 47K ohms 1/16W
R82	ERJ3GEYJ391	Carbon 390 ohms 1/16W	R169	ERJ3GEYJ104	Carbon 100K ohms 1/16W
R83	ERJ3GEYJ224	Carbon 220K ohms 1/16W	R170	ERJ3GEYJ102	Carbon 1K ohms 1/16W
R84	ERJ3GEYJ104	Carbon 100K ohms 1/16W	R171,172	ERJ3GEYJ473	Carbon 47K ohms 1/16W
R85	YW2116225GT	Carbon 2.2M ohms 1/16W	R173	ERJ3GEYJ223	Carbon 22K ohms 1/16W
R86	ERJ3GEYJ154	Carbon 150K ohms 1/16W	R174	ERJ3GEYJ333	Carbon 33K ohms 1/16W
R87	YW2116225GT	Carbon 2.2M ohms 1/16W	R175,176	ERJ3GEYJ473	Carbon 47K ohms 1/16W
R88	ERJ3GEYJ103	Carbon 10K ohms 1/16W	R177	ERJ3GEYJ223	Carbon 22K ohms 1/16W
R89	ERJ3GEYJ223	Carbon 22K ohms 1/16W	R178	ERJ3GEYJ303	Carbon 30K ohms 1/16W
R90	YF2116222GT	Carbon 2.2K ohms 1/16W	R179	ERJ3GEYJ203	Carbon 20K ohms 1/16W
R91	YF2116752GT	Carbon 7.5K ohms 1/16W	R180	ERJ3GEYJ103	Carbon 10K ohms 1/16W
R92	YF2116753GT	Carbon 75K ohms 1/16W	R189	ERJ3GEYJ102	Carbon 1K ohms 1/16W
R93	YF2116333GT	Carbon 33K ohms 1/16W	R192,193	ERJ3GEYJ303	Carbon 30K ohms 1/16W
R94	YF2116223GT	Carbon 22K ohms 1/16W	R194	ERJ3GEYJ103	Carbon 10K ohms 1/16W
R95	YF2116393GT	Carbon 39K ohms 1/16W	R195,196	ERJ3GEYJ472	Carbon 4.7K ohms 1/16W
R96	YW2116564GT	Carbon 560K ohms 1/16W	R197,198	ERJ3GEYJ303	Carbon 30K ohms 1/16W
R97	YF2116114JT	Carbon 110K ohms 1/16W	R199	ERJ3GEYJ103	Carbon 10K ohms 1/16W
R98	YW2116474GT	Carbon 470K ohms 1/16W	R200,201	ERJ3GEYJ472	Carbon 4.7K ohms 1/16W
R99	ERJ3GEYJ103	Carbon 10K ohms 1/16W	R202	ERJ3GEYJ513	Carbon 51K ohms 1/16W
R100-106	ERJ3GEYJ101	Carbon 100 ohms 1/16W	R203	ERJ3GEYJ104	Carbon 100K ohms 1/16W
R113	ERJ3GEYJ222	Carbon 2.2K ohms 1/16W	R205	ERJ3GEYJ183	Carbon 18K ohms 1/16W
R114	ERJ3GEYJ153	Carbon 15K ohms 1/16W	R206,207	ERJ3GEYJ103	Carbon 10K ohms 1/16W
R119	ERJ3GEYJ222	Carbon 2.2K ohms 1/16W	R208	ERJ3GEYJ272	Carbon 2.7K ohms 1/16W
R120	ERJ3GEYJ153	Carbon 15K ohms 1/16W	R209	ERJ3GEYJ202	Carbon 2K ohms 1/16W
R122	ERJ3GEYJ433	Carbon 43K ohms 1/16W	R210	ERJ3GEYJ273	Carbon 27K ohms 1/16W
R123	ERJ3GEYJ562	Carbon 5.6K ohms 1/16W	R211	ERJ3GEYJ563	Carbon 56K ohms 1/16W
R125	ERJ3GEYJ433	Carbon 43K ohms 1/16W	R212	ERJ3GEYJ103	Carbon 10K ohms 1/16W
R126	ERJ3GEYJ562	Carbon 5.6K ohms 1/16W	R213	ERJ3GEYJ562	Carbon 5.6K ohms 1/16W
R131	ERJ3GEYJ104	Carbon 100K ohms 1/16W	R214	ERJ3GEYJ123	Carbon 12K ohms 1/16W
R132	ERJ3GEYJ103	Carbon 10K ohms 1/16W	R215	ERJ3GEYJ223	Carbon 22K ohms 1/16W
R133	ERJ3GEYJ203	Carbon 20K ohms 1/16W	R216	ERJ3GEYJ472	Carbon 4.7K ohms 1/16W
R134	ERJ3GEYJ103	Carbon 10K ohms 1/16W	R217	ERJ3GEYJ333	Carbon 33K ohms 1/16W
R135	ERJ3GEYJ203	Carbon 20K ohms 1/16W	R218,219	ERJ3GEYJ103	Carbon 10K ohms 1/16W
R138	ERJ3GEYJ512	Carbon 5.1K ohms 1/16W	R220,221	ERJ3GEYJ333	Carbon 33K ohms 1/16W
R139,140	ERJ3GEYJ433	Carbon 43K ohms 1/16W	R223	ERJ3GEYJ333	Carbon 33K ohms 1/16W
R141	ERJ3GEYJ823	Carbon 82K ohms 1/16W	R228	ERJ3GEYJ303	Carbon 30K ohms 1/16W
R143	ERJ3GEYJ473	Carbon 47K ohms 1/16W	R229	ERJ3GEYJ203	Carbon 20K ohms 1/16W
R144	ERJ3GEYJ472	Carbon 4.7K ohms 1/16W	R230	ERJ3GEYJ223	Carbon 22K ohms 1/16W
R145	ERJ3GEYJ823	Carbon 82K ohms 1/16W	R231	ERJ3GEYJ472	Carbon 4.7K ohms 1/16W
R147,148	ERJ3GEYJ333	Carbon 33K ohms 1/16W	R232	ERJ3GEYJ912	Carbon 9.1K ohms 1/16W
R149	ERJ3GEYJ152	Carbon 1.5K ohms 1/16W	R233	ERJ3GEYJ621	Carbon 620 ohms 1/16W
R150	ERJ3GEYJ332	Carbon 3.3K ohms 1/16W	R234	ERJ3GEYJ103	Carbon 10K ohms 1/16W
R151	ERJ3GEYJ752	Carbon 7.5K ohms 1/16W	R250,251	ERJ3GEYJ152	Carbon 1.5K ohms 1/16W
R152,153	ERJ3GEYJ103	Carbon 10K ohms 1/16W	R252,253	ERJ3GEYJ473	Carbon 47K ohms 1/16W
R154	ERJ3GEYJ752	Carbon 7.5K ohms 1/16W	R254	ERJ3GEYJ471	Carbon 4.7K ohms 1/16W
R155	ERJ3GEYJ332	Carbon 3.3K ohms 1/16W	VR1-3	EVML1GA00B14	Variable Resistor 10K ohms
R156	ERJ3GEYJ152	Carbon 1.5K ohms 1/16W	Z1	RKM9L154F	Block Resistor
R157,158	ERJ3GEYJ333	Carbon 33K ohms 1/16W			

REF.NO.	PART NO.	DESCRIPTION	
C1	ECEA0JKS470	Electrolytic	47 µF 6.3V
C2	ECEA1HK010	Electrolytic	1 µF 50V
C3	YW5CH680J5VB	Ceramic	68 pF
C4	ECEA1CKS100	Electrolytic	10 µF 16V
C5	ECEA0JS470	Electrolytic	47 µF 6.3V
C6	YW5CH300J5VB	Ceramic	30 pF
C7	ECEA0JS470	Electrolytic	47 µF 6.3V
C8	YW5X222K5VB	Ceramic	2200 pF
C9	YW5F104Z2VB	Ceramic	0.1 µF
C10	ECEA1AKA220	Electrolytic	22 µF 10V
C11-13	ECEA1CKA100	Electrolytic	10 µF 16V
C14	YW5CH680J5VB	Ceramic	68 pF
C15	ECEA0GKS470	Electrolytic	47 µF 4V
C16-18	ECEA1CKA100	Electrolytic	10 µF 16V
C19	YW5CH680J5VB	Ceramic	68 pF
C20	ECEA0JKS470	Electrolytic	47 µF 6.3V
C21	YW5CH121J5VB	Ceramic	120 pF
C22	YW5CH101J5VB	Ceramic	100 pF
C23	ECEA0JU471	Electrolytic	470 µF 6.3V
C26	ECEA1AKS470	Electrolytic	47 µF 10V
C27	YW5X102K5VB	Ceramic	1000 pF
C28	YW5F104Z2VB	Ceramic	0.1 µF
C29	ECEA1CKS100	Electrolytic	10 µF 10V
C30	YW5X103K2VB	Ceramic	0.01 µF
C31	ECEA1HKS010	Electrolytic	1 µF 50V
C32-34	ECEA0JK220	Electrolytic	22 µF 6.3V
C35	ECEA1HKS010	Electrolytic	1 µF 50V
C36,37	ECEA0JK220	Electrolytic	22 µF 6.3V
C38	ECEA0JS470	Electrolytic	47 µF 6.3V
C40	YW5CH101J5VB	Ceramic	100 pF
C41	YW5X103K2VB	Ceramic	0.01 µF
C42	ECEA0JKA221	Electrolytic	220 µF 6.3V
C43	ECEA1CKS470	Electrolytic	47 µF 16V
C44-47	YW5F473Z2VB	Ceramic	0.047 µF
C48,49	ECEA0JKS470	Electrolytic	47 µF 6.3V
C50	ECEA1HK010	Electrolytic	1 µF 50V
C51	ECEA0JKS101	Electrolytic	100 µF 6.3V
C52	YW5X222K5VB	Ceramic	2200 pF
C53	ECEA1CKS100	Electrolytic	10 µF 10V
C54	ECEA0GKS470	Electrolytic	47 µF 4V
C55	ECEA0JK220	Electrolytic	22 µF 6.3V
C56	YW5F104Z2VB	Ceramic	0.1 µF
CT1	YWTZ03P450YR	Trimmer Capacitor	
L1	ELJFA101KF	Coil	100 µH
L2	ELJFA8R2MF	Coil	8.2 µH
L3	ELJFA221KF	Coil	220 µH
T1	EIR7QF020B	Power Transformer	
SW1	YWSSF-012M	Slide Switch	
X1	YFKF38G	Crystal Oscillator	
X2	EF0-FC8004	Crystal Oscillator	
CN1	YW530202410	Connector	
CN2,3	YW530203010	Connector	
CN4	YW559713APB	Connector	
J1,3	ERJ3GEY0R00	Jumper Resistor	

REF.NO.	PART NO.	DESCRIPTION
J107,124	ERJ3GEY0R00	Jumper Resistor
J127,130	ERJ3GEY0R00	Jumper Resistor
J227	ERJ3GEY0R00	Jumper Resistor
TP1	YW32BM5A	Test-pin
M77	YWV2HA0819A4	Shield Cover D
M78	YWV2HA0820A4	Shield Case D

POWER BOARD

PCB6 (NLA)	YWVKYF015E1A	Printed Circuit Board Assy	
IC1	YWBA6149LS	IC	
IC2	YWNJM431µTE1	IC	
IC3	NJM3414M	IC	
IC4	MN4073BS	IC	
Q1	2SB837-CD	Transistor	
Q2	2SB766-RS	Transistor	
Q3	2SD1819-QRS	Transistor	
Q4	2SB837-CD	Transistor	
Q5,6	2SB766-RS	Transistor	
Q7	2SD874A-RS	Transistor	
Q8	2SB1218-QRS	Transistor	
Q9,10	2SD1819-QRS	Transistor	
Q11	2SB1218-QRS	Transistor	
Q12	2SB766A-QR	Transistor	
Q13	2SD1819-QRS	Transistor	
D1	EK14	Diode	
D2	MA141K	Diode	
D3	EK14	Diode	
D4,5	MA141K	Diode	
D6,7	EK14	Diode	
D8,9	MA141WK	Diode	
D10	MA124	Diode	
D11	MA141K	Diode	
D12	1SS108	Diode	
R5	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R6	YF2116472GT	Carbon	4.7K ohms 1/16W
R9	YW2116360GT	Carbon	36 ohms 1/16W
R10	ERJ3GEYJ331	Carbon	330 ohms 1/16W
R11,12	ERJ3GEYJ203	Carbon	20K ohms 1/16W
R13	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R14	R1220P123D	Metal	12K ohms
R15	YWR1220P153D	Metal	15K ohms
R16	YF2116101JT	Carbon	100 ohms 1/16W
R17,18	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R19	YWR1220P103D	Metal	10K ohms
R20	YWR1220P153D	Metal	15K ohms
R21	YF2116102GT	Carbon	1K ohms 1/16W
R22	ERJ3GEYJ221	Carbon	220 ohms 1/16W
R23	ERJ3GEYJ683	Carbon	68K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R24	ERJ3GEYJ243	Carbon	24K ohms 1/16WF
R25	YWR1220P163D	Metal	16K ohms
R26	YWR1220P752D	Metal	7.5K ohms
R27	ERJ3GEYJ202	Carbon	2K ohms 1/16W
R28	YF2116122JT	Carbon	1.2K ohms 1/16W
R29	YFR1220P203D	Metal	20K ohms
R30	YWR1220P103D	Metal	10K ohms
R31,32	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R33	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R34	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R35	YW2116244GT	Metal	240K ohms 1/16W
R36	YF2116243GT	Carbon	24K ohms 1/16W
R37	ERJ3GEYJ473	Carbon	47K ohms 1/16W
R38	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R39	ERJ3GEYJ473	Carbon	47K ohms 1/16W
R42	YF2116103JT	Carbon	10K ohms 1/16W
R43	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R44	YF2116134GT	Carbon	130K ohms 1/16W
R45	YF2116243GT	Carbon	24K ohms 1/16W
R46	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R47,48	ERJ3GEYJ473	Carbon	47K ohms 1/16W
R49	ERJ3GEYJ472	Carbon	4.7K ohms 1/16W
R50	ERJ3GEYJ224	Carbon	220K ohms 1/16W
R51	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R52	YF2116102GT	Carbon	1K ohms 1/16W
R53	YF2116122GT	Carbon	1.2K ohms 1/16W
R54	ERJ3GEYJ222	Carbon	2.2K ohms 1/16W
R55	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R56	ERJ3GEYJ473	Carbon	47K ohms 1/16W
R57	ERJ3GEYJ823	Carbon	82K ohms 1/16W
R58	ERJ3GEYJ302	Carbon	3K ohms 1/16W
R59	ERJ3GEYJ102	Carbon	1K ohms 1/16W
VR1,2	EVML1GA00BQ3	Variable Resistor	
C2	ECA1EFQ221	Electrolytic	220 µF25V
C3,4	ECEA1HK010	Electrolytic	1 µF 50V
C5	YW5CH820J5VB	Ceramic	82 pF
C6	YW5X561K5VB	Ceramic	560 pF
C7	ECA0JFQ680	Electrolytic	68 µF 6.3V
C9	ECA1AFQ471	Electrolytic	470 µF 10V
C10	ECEA1HKKR47	Electrolytic	0.47 µF 50V
C11	ECA1AFQ471	Electrolytic	470 µF 10V
C12	ECSF1EE475	Electrolytic	4.7 µF 25V
C14	ECA1AFQ181	Electrolytic	180 µF 10V
C15	YW5X103K2VB	Ceramic	0.01 µF
C16	ECA1AFQ181	Electrolytic	180 µF 10V
C17	ECEA0GKK220	Electrolytic	22 µF 4V
C18	ECEA1HKK2R2	Electrolytic	2.2 µF 25V
C19	ECA1VFQ270	Electrolytic	27 µF 35V
C20	YW5X103K2VB	Ceramic	0.01µF
C22	ECA1VFQ270	Electrolytic	27 µF 35V
C23	YW5X102K5VB	Ceramic	1000 pF
C24	ECA1VFQ270	Electrolytic	27 µF 35V
C25	YW5X103K2VB	Ceramic	0.01µF
C26	ECA1VFQ270	Electrolytic	27 µF 35V
C27	ECEA0JKS470	Electrolytic	47 µF 6.3V

REF.NO.	PART NO.	DESCRIPTION	
C28	YW5CH151J5VB	Ceramic	150 pF
C29	ECEA1CKK100	Electrolytic	10 µF 16V
L1	YWPJ66470K	Coil	47 µH
L2	YWPF10221	Coil	220 µH
L3	YWPJ87221K	Coil	220 µH
L4	YFPF8201K	Coil	200 µH
L5	YWPJ87331K	Coil	330 µH
L6	YWTL8222J	Coil	
L7	ELJFA8R2MF	Coil	8.2 µH
L8	YWPJ66222K	Coil	
L9	ELJFA8R2MF	Coil	8.2 µH
X1	EF0A700K04LA	Crystal Oscillator	
CN1	YW530201610	16-pin Connector	
J1,3	ERJ3GEY0R00	Jumper Resistor	
J7	ERJ3GEY0R00	Jumper Resistor	
J31,32	YF21160R00T	Jumper Resistor	
J41	ERJ3GEY0R00	Jumper Resistor	
M79	YWV2HA0821A4	Shield Cover E	
M80	YWV2HA0822A4	Shield Case E	

AUDIO BOARD

PCB7 (NLA)	YWVKZF015E2A	Printed Circuit Board Assy	
IC1,2	NJM4558M	IC	
IC3	NJM3415M	IC	
IC4	YWNJU4053M	IC	
Q1	2SC2405ST	Transistor	
Q2	2SD601-RS	Transistor	
Q3	2SC2405ST	Transistor	
Q4,5	2SD601-RS	Transistor	
Q6	2SB709-RS	Transistor	
Q7	2SD601-RS	Transistor	
Q8	2SB709-RS	Transistor	
Q9,10	2SD601-RS	Transistor	
D1,2	MA151K	Diode	
D3	HZ9LB-2	Diode	
D4	MA151WA	Diode	
R1,2	YF2116681JT	Carbon	680 ohms 1/16W
R3,4	YF2116822JT	Carbon	8.2K ohms 1/16W
R5	YF2116103JT	Carbon	10K ohms 1/16W
R6	YF2116223JT	Carbon	22K ohms 1/16W
R7	YF2116272JT	Carbon	2.7K ohms 1/16W
R8	YF2116123JT	Carbon	12K ohms 1/16W
R9	YF2116102GT	Carbon	1K ohms 1/16W
R10	YF2116332JT	Carbon	3.3K ohms 1/16W
R11	YF2116473GT	Carbon	47K ohms 1/16W
R12	YF2116223JT	Carbon	22K ohms 1/16W
R13	YF2116102GT	Carbon	1K ohms 1/16W
R14	YF2116104JT	Carbon	100K ohms 1/16W
R15	YF2116223JT	Carbon	22K ohms 1/16W
R16	YF2116103JT	Carbon	10K ohms 1/16W
R17	YF2116272JT	Carbon	2.7K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION	
R18	YF2116123JT	Carbon	12K ohms 1/16W
R19	YF2116102GT	Carbon	1K ohms 1/16W
R20	YF2116332JT	Carbon	3.3K ohms 1/16W
R21	YF2116473GT	Carbon	47K ohms 1/16W
R22	YF2116223JT	Carbon	22K ohms 1/16W
R23	YF2116102GT	Carbon	1K ohms 1/16W
R24	YF2116104JT	Carbon	100K ohms 1/16W
R25	YF2116332JT	Carbon	3.3K ohms 1/16W
R26	YF2116122JT	Carbon	1.2K ohms 1/16W
R27	YF2116102GT	Carbon	1K ohms 1/16W
R28	YF2116470JT	Carbon	47 ohms 1/16W
R29	YF2116101JT	Carbon	100 ohms 1/16W
R30	YF2116200JT	Carbon	20 ohms 1/16W
R31	YF2116203JT	Carbon	20K ohms 1/16W
R32	YF2116303GT	Carbon	30K ohms 1/16W
R33	YF2116823JT	Carbon	82K ohms 1/16W
R34,35	YF21158R2JT	Carbon	8.2 ohms 1/16W
R37-40	YF2116102GT	Carbon	1K ohms 1/16W
R40	YF2116122JT	Carbon	1.2K ohms 1/16W
R41	YF2116104JT	Carbon	100K ohms 1/16W
R42	YF2116392JT	Carbon	3.9K ohms 1/16W
R43	YF2116750JT	Carbon	75 ohms 1/16W
R44	YF2116103JT	Carbon	10K ohms 1/16W
R45	YF2116222GT	Carbon	2.2K ohms 1/16W
R46	YF2116333GT	Carbon	33K ohms 1/16W
R47	YF2116103JT	Carbon	10K ohms 1/16W
R48	YF2116333GT	Carbon	33K ohms 1/16W
R49,50	YF2116103JT	Carbon	10K ohms 1/16W
R51	YF2116333GT	Carbon	33K ohms 1/16W
R52	YF2116103JT	Carbon	10K ohms 1/16W
R53	YF2116333GT	Carbon	33K ohms 1/16W
R54	YF2116102GT	Carbon	1K ohms 1/16W
R55	YF2116154JT	Carbon	150K ohms 1/16W
R56	YF2116123JT	Carbon	12K ohms 1/16W
R62	YF2116103JT	Carbon	10K ohms 1/16W
C1,2	ECEA0JKS101	Electrolytic	100 µF 6.3V
C3	ECQV1H473JZ	Plastic	0.047F 50V (TF)
C4	YF400103XKT	Ceramic	0.01 µF
C5	ECEA0JKS470	Electrolytic	47 µF 6.3V (KA)
C6	ECEA1AKN100	Electrolytic	10 µF 10V
C7	YF400102XKT	Ceramic	1000 pF
C8	YF400680CHJT	Ceramic	68 pF CH
C9	ECEA1HK010	Electrolytic	1 µF 50V
C10	YF400224FZT	Ceramic	0.22 µF
C11	YF400102XKT	Ceramic	1000 pF
C12	YF400151CHJT	Ceramic	150 pF
C13	ECEA1HKS010	Electrolytic	1 µF 50V
C14	ECQV1H473JZ	Plastic	0.047 µF 50V (TF)
C15	YF400103XKT	Ceramic	0.01 µF
C16	ECEA0JKS470	Electrolytic	47 µF 6.3V (KA)
C17	ECEA1AKN100	Electrolytic	10 µF 10V
C18	YF400102XKT	Ceramic	1000 pF
C19	ECEA1HK010	Electrolytic	1 µF 50V
C20	YF400680CHJT	Ceramic	68 pF CH
C21	YF400224FZT	Ceramic	0.22 µF

REF.NO.	PART NO.	DESCRIPTION	
C22	YF400102XKT	Ceramic	1000 pF
C23	YF400151CHJT	Ceramic	150 pF
C24	ECEA1HKS010	Electrolytic	1 µF 50V
C25,26	ECEA1AKS470	Electrolytic	47 µF 10V
C27	YF400102XKT	Ceramic	1000 pF
C28	ECEA1CKS470	Electrolytic	47 µF 16V
C29,30	ECEA0JKS470	Electrolytic	47 µF 6.3V (KA)
C31,32	YF400473FZT	Ceramic	0.047 µF
C33-36	YF400224FZT	Ceramic	0.22 µF
C37	ECEA0JN221S	Electrolytic	
C38,39	YF400102XKT	Ceramic	1000 pF
C41	ECEA1HKK2R2	Electrolytic	2.2 µF 25V
SW1	YWSSSB022	Slide Switch	
SW2	YWSSSB023	Slide Switch	
CF1,2	YFBL1RN1A62	Filter	
F1 ⚠	YWSSFR1R5A	Current Fuse	
F2 ⚠	YWSSFR2A	Current Fuse	
J36,63	YF21160R00T	Jumper Resistor	
CN1,2	ILWY30PD15T	30-pin Connector	
CN3	EMCS1050Z	10-pin Connector	
CN4	YW559711CPB	11-pin Connector	
CN5	YW559704CPB	4-pin Connector	
CN6,7	EMCS0850Z	8-pin Connector	
CN8	YW559718CPB	18-pin Connector	
CN9	YF559720CPB	20-pin Connector	

SENSOR BOARD

PCB8 (NLA)	YWVKYF015E4A	Printed Circuit Board Assy
IC2	YWCXB0026AM	IC
IC3	YWTC7S08FR	IC
IC4	YWTC7S32FR	IC
IC5	YWCXA1065M	IC
IC6	MN74HC02S	IC
IC7,8	MN74HC161S	IC
Q1	2SK662-PQR	FET
Q2	2SA1462	Transistor
Q3,4	2SC3735	Transistor
Q5	2SA1462	Transistor
Q6-8	2SD1819-QRS	Transistor
Q9	2SB1218-QRS	Transistor
Q10,11	2SD1819-QRS	Transistor
Q12	2SB1218-QRS	Transistor
Q13	2SD1819-QRS	Transistor
Q14	XN4601	Transistor
D1,2	MA141K	Diode
D3	MA141WA	Diode
D4,5	MA143	Diode
D6,7	MA141K	Diode
D8	MA141WA	Diode
D9,10	MA141K	Diode
D11,12	MA141WK	Diode
D13	MA141K	Diode

REF.NO.	PART NO.	DESCRIPTION	
D14,15	MA141WA	Diode	
D16	MA143	Diode	
R1	ERJ3GEYJ105	Carbon	1M ohms 1/16W
R2	ERJ3GEYJ391	Carbon	390 ohms 1/16W
R4	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R5	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R6	ERJ3GEYJ150	Carbon	15 ohms 1/16W
R7	ERJ3GEYJ105	Carbon	1M ohms 1/16W
R8	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R9	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R10	ERJ3GEYJ274	Carbon	270K ohms 1/16W
R11	ERJ3GEYJ393	Carbon	39K ohms 1/16W
R12	ERJ3GEYJ273	Carbon	27K ohms 1/16W
R13	ERJ3GEYJ563	Carbon	56K ohms 1/16W
R14,15	ERJ3GEYJ150	Carbon	15 ohms 1/16W
R16	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R17	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R18	ERJ3GEYJ332	Carbon	3.3K ohms 1/16W
R19,20	ERJ3GEYJ100	Carbon	10 ohms 1/16W
R21-23	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R24	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R25,26	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R27,28	ERJ3GEYJ104	Carbon	100K ohms 1/16W
R31	ERJ3GEYJ562	Carbon	5.6K ohms 1/16W
R32	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R39	ERJ3GEYJ123	Carbon	12K ohms 1/16W
R40	ERJ3GEYJ183	Carbon	18K ohms 1/16W
R41-44	ERJ3GEYJ394	Carbon	390K ohms 1/16W
R45	ERJ3GEYJ101	Carbon	100 ohms 1/16W
R46	ERJ3GEYJ391	Carbon	390 ohms 1/16W
R47	ERJ3GEYJ683	Carbon	68K ohms 1/16W
R48	ERJ3GEYJ273	Carbon	27K ohms 1/16W
R49-53	ERJ3GEYJ105	Carbon	1M ohms 1/16W
R54	ERJ3GEYJ102	Carbon	1K ohms 1/16W
R55	ERJ3GEYJ394	Carbon	390K ohms 1/16W
R56	ERJ3GEYJ105	Carbon	1M ohms 1/16W
R57	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R58	ERJ3GEYJ303	Carbon	30K ohms 1/16W
R59	ERJ3GEYJ683	Carbon	68K ohms 1/16W
C1	YW5X102K5VB	Ceramic	1000 pF
C2	ECST1CD336	Tantalum	33 µF 16V
C3	YW5X103K2VB	Ceramic	0.01 µF
C4	ECST1ED106ZR	Tantalum	1 µF 25V
C5	ECST1CD336	Tantalum	33 µF 16V
C6	ECST1AD476ZR	Tantalum	47 µF 10V
C7	YW5X103K2VB	Ceramic	0.01 µF
C8	ECST1CB335ZR	Tantalum	3.3 µF 16V
C9	YW5CH220J5VB	Ceramic	22 pF
C10	YW5CH181J5VB	Ceramic	180 pF
C11	YW5X103K2VB	Ceramic	0.01 µF
C12-18	ECEA1HKS3R3	Electrolytic	3.3 µF 50V
C19	YW5X103K2VB	Ceramic	0.01 µF
C20	YW5X102K5VB	Ceramic	1000 pF
C21	ECEA1VKA470	Electrolytic	47 µF 35
C22	ECST1CB335ZR	Tantalum	3.3 µF 16V
C23,24	YW5X103K2VB	Ceramic	0.01 µF
C25	ECST1CD336	Tantalum	33 µF 16V
C26,27	YW5CH101J5VB	Ceramic	100 pF
C28,29	ECST1AB106	Tantalum	10 µF 10V
C30	YW5CH101J5VB	Ceramic	100 pF
C32,33	ECST1AB106	Tantalum	10 µF 10V
C34-37	ECEA1HKAR47	Electrolytic	0.47 µF 50V
C38	YW5F104Z2VB	Ceramic	0.1 µF
C39-44	ECEA1HKS3R3	Electrolytic	3.3 µF 50V
C45-47	ECEA1CKA100	Electrolytic	10 µF 16V
C48	YW5F104Z2VB	Ceramic	0.1 µF
C49	ECEA1CKA100	Electrolytic	10 µF 16V
C50	ECSF1AE106	Electrolytic	10 µF 10V
L1,2	ELJFA8R2MF	Coil	8.2 µH
L3	HF70BB5X5X2	Coil	
J3,34	ERJ3GEY0R00	Jumper Resistor	
J35,37	ERJ3GEY0R00	Jumper Resistor	
J60,62	ERJ3GEY0R00	Jumper Resistor	
J64,65	ERJ3GEY0R00	Jumper Resistor	
CN1	YW559722APB	Connector	
CN2	YF0M20P	Socket	

BATTERY BOARD

PCB9	YWVRZF015P3A	Printed Board	
SW1	YWSSS222AN	Slide Switch	
E106	YWF15J6A	Flexible Board	

MIC JACK BOARD

PCB10	YWVRZF015P4A	Printed Board	
CN1	YWM0JB553	Connector	
CN2	YWM0JB56	Connector	
E105	YWF15J5A	Flexible Board	

MOTHER BOARD

PCB11 (NLA)	YWVKZF015E1A	Printed Circuit Board Assy	
IC1	YWNJU4053M	IC	
IC2	MN74HC221S	IC	
Q1,2	2SD601-RS	Transistor	
D1-3	MA151K	Diode	
R1	YF2116102GT	Carbon	1K ohms 1/16W
R2	YF2116333GT	Carbon	33K ohms 1/16W
R3,4	YF2116243JT	Carbon	24K ohms 1/16WF
R5	YF2116823JT	Carbon	82K ohms 1/16W
R11,13	YF2116102GT	Carbon	1K ohms 1/16W

V10437

ORDER NO. AVS9008368S8

Service Manual

System Camera

WV-F15E

Supplement-2

- Please file this supplement service manual with the service manual Order No. AVS900279C8.

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Panasonic

LIST OF MODIFICATION

◆ **Sensor Board (On page 9, 10)**

- Sensor Board has been changed as shown on page 10.
- The part numbers have been corrected as shown in the parts list.

◆ **Drive Board (On page 11, 12)**

- Drive Board has been changed as shown on page 11.
- VR6, R230 and R231 have been added to stabilize the auto iris control circuit.
- The rest of part numbers have been corrected as shown in the parts list.

◆ **Process Board (On page 13, 14)**

- Process Board has been changed as shown on page 14.
- R35 and C89 have been changed to improve the carrier balance of Y/C and composite signals.
- The rest of part numbers have been corrected as shown in the parts list.

◆ **Process Sub Board (On page 15, 16)**

- Process Sub Board has been changed as shown on page 15.
- The part numbers have been corrected as shown in the parts list.

◆ **Microprocessor Board (On page 17, 18)**

- Microprocessor Board has been changed as shown on page 18.
- D1 has been removed to prevent problem that no colour bar appears (with RCU and RCU adaptor) when pressing return switch.
- The rest of part numbers have been corrected as shown in the parts list.

◆ **Sync Board (On page 19, 20)**

- Sync Board has been changed as shown on page 19.
- R38 and C34 have been changed to make SC adjustment easy.
- R16, R17 and R19 have been changed to change variable range of horizontal phase.
- The rest of part numbers have been corrected as shown in the parts list.

◆ **Audio Board (On page 21, 22)**

- Audio Board has been changed as shown on page 22.
- R30 has been changed to prevent audio noise.
- The rest of part numbers have been corrected as shown in the parts list.

◆ **Mother Board (On page 23, 24)**

- Mother Board has been changed as shown on page 23.
- The part numbers have been corrected as shown in the parts list.

◆ **Power Board (On page 25)**

- The part numbers have been corrected as shown in the parts list.

5. ADJUSTMENT PROCEDURE

5-1 Connection and Setting Up for Adjustment

Connection

- Connect the camera cable between the camera and the power supply WV-PS01B or mount the AC adaptor WV-PS03 on the camera unit.
- Connect the video cable from the power supply WV-PS01B to the colour video monitor through the vectorscope, or connect coaxial cable between the AC adaptor WV-PS03 and the colour video monitor through the vectorscope.
- Terminate the video input of the colour video monitor with 75 ohm. (Fig. 5-1 and Fig.5-2).

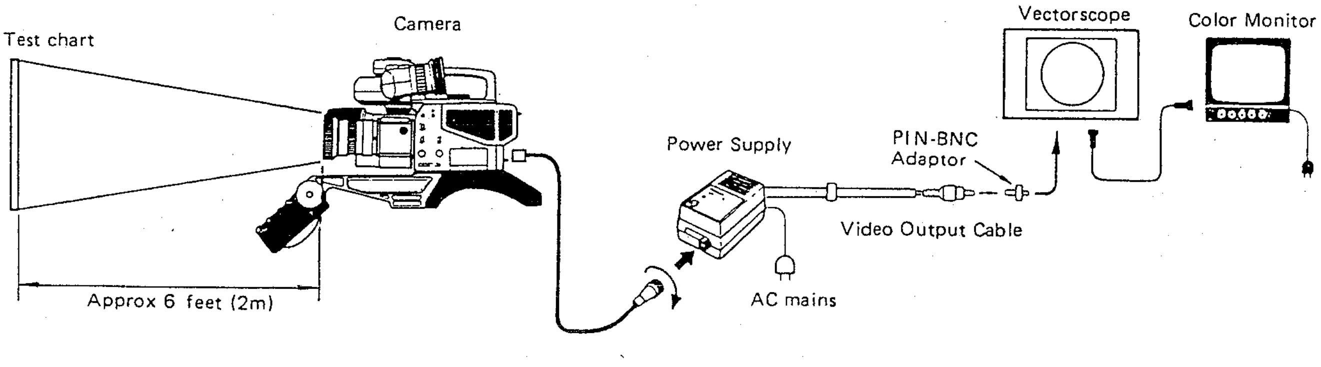

Test chart
Camera
Vectorscope
Color Monitor
Power Supply
PIN-BNC Adaptor
Video Output Cable
AC mains
Approx 6 feet (2m)

Fig. 5-1

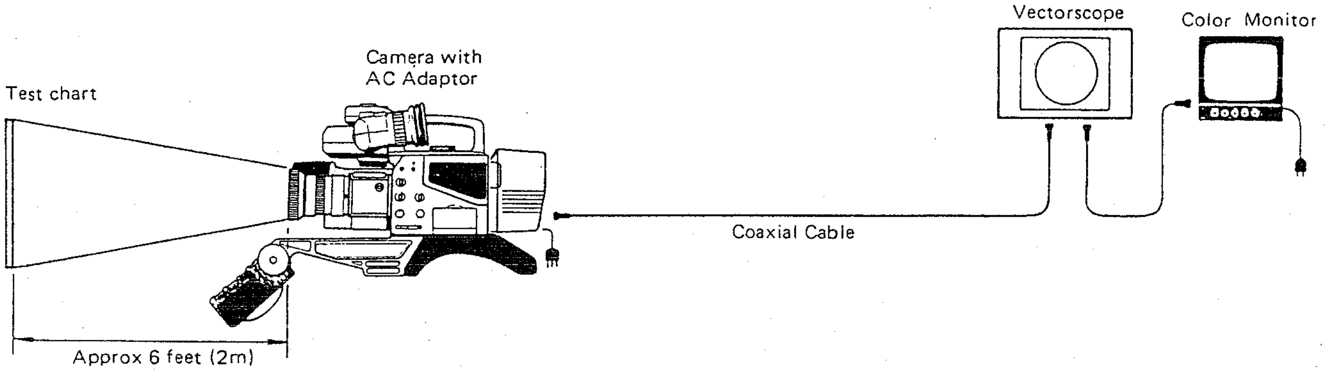

Test chart
Camera with AC Adaptor
Vectorscope
Color Monitor
Coaxial Cable
Approx 6 feet (2m)

Fig. 5-2

5-2-1 Camera Head Adjustment

(4) INT H. PLL adjustment

Test point:	**TP1 (INT H. PLL)**	**Sync board**
Adjust:	**CT1 (INT H. PLL)**	**Sync board**

- Connect the oscilloscope to TP1.
- Set the oscilloscope to DC mode.
- Adjust CT1 (INT H. PLL) for 2.5V ± 0.1V. (Fig. 5-2-2)

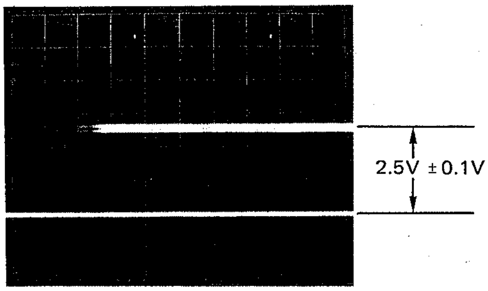


Fig. 5-2-2

(6) SC-lock 1 adjustment

Test point:	**TP4 (SC-lock)**	**Sync board**
Adjust:	**CT2 (SC-lock1)**	**Sync board**

- Mount the gen-lock adaptor WV-AD36 on the camera.
- Supply the colour bar or black burst signal from the signal generator to the gen-lock input connector on the gen-lock adaptor.
- Connect the oscilloscope to TP 4.
- Set the oscilloscope to DC mode.
- Adjust CT2 (SC-lock1) for 2.1V ± 0.1V. (Fig. 5-2-4)

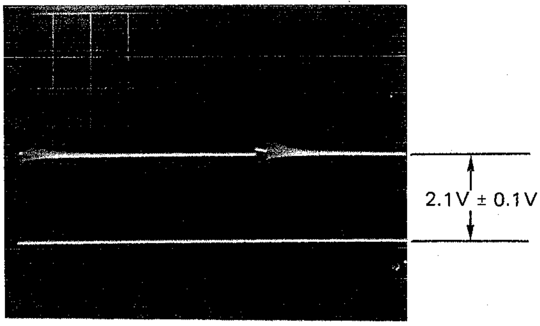


Fig. 5-2-4

(7) SC-lock 2 sub adjustment

Note : This adjustment should be carried out only when item (6) can not be adjusted to 2.1V ± 0.1V.

Test point:	**TP4 (SC-lock)**	**Sync board**
Adjust:	**L5 (SC-lock 2)**	**Sync board**

- Mount the gen-lock adapter WV-AD36 on the camera.
- Supply the colour bar or black burst signal from the signal generator to the gen-lock input connector on the gen-lock adaptor.
- Connect the oscilloscope to TP 4.
- Set the oscilloscope to DC mode,
- Adjust L5 (SC-lock 2) for 2.1V ± 0.1V. (Fig. 5-2-4)
- Disconnect the gen-lock adapter WV-AD36.

(9)-1 DC offset adjustment

Test point:	**TP2 (DC OFFSET)**	**Drive board**
Adjust:	**Emitter of Q12**	**Drive board**
	VR6 (DC OFFSET)	**Drive board**

- Cap on the lens.
- Connect the oscilloscope to TP2 (DC OFFSET) and emitter of Q12.
- Set the oscilloscope to DC mode.
- Adjust VR6 (DC OFFSET) so that DC voltage at TP2 becomes same level as that of emitter of Q12.

(11) AGC adjustment

Test point:	**TP6 (Y)**	**Process Sub board**
Adjust:	**VR1 (AGC Level)**	**Drive board**
	VR2 (AGC off level)	**Drive board**

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to TP6 (Y OUT).
- Set the oscilloscope to H. rate.
- Set the AGC Selection Switch to the OFF (lower) position.
- Adjust VR2 (AGCoff level) for 0.15V ± 0.01V from the blanking level to the top step of the gray scale waveform. (Fig. 5-2-8)

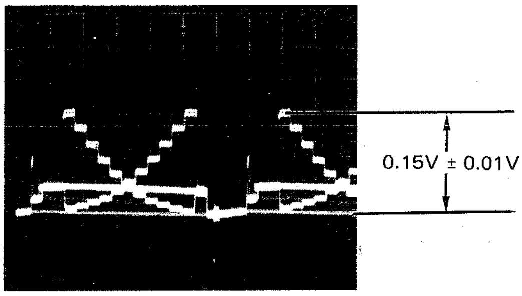


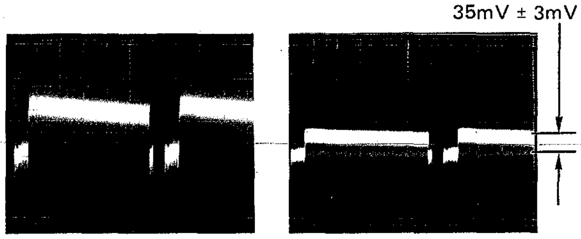
Fig. 5-2-8

- Set the AGC Selection Switch to the Low (center) position.
- Adjust VR1 (AGC Level) for 0.15V ± 0.01V from the blanking level to the top step of the gray scale waveform. (Fig. 5-2-8)
- Set the AGC Selection Switch to the OFF position.

(12) Pedestal adjustment

Test point: **Pin3 (Y OUT) of S-Video out connector**
Adjust: **VR4 (PEDESTAL)** **Process Sub board**

- Cap on the lens.
- Connect the oscilloscope to pin3 (Y OUT) of S-Video out connector and terminate the Y OUT with 75ohm.
- Set the oscilloscope to H. rate.
- Adjust VR4 (PEDESTAL) so that the pedestal level at pin3 (Y OUT) becomes 35mV ± 3mV. (Fig. 5-2-9)



NO GOOD **GOOD**

Fig. 5-2-9

(14) YH out adjustment

Test point: **Pin3 (Y OUT) of S-Video out connector**
Adjust: **VR1 (YH)** **Process sub board**

- Aim the camera at the logarithmic gray scale chart.
- Connect the oscilloscope to pin3 (Y OUT) of S-Video out connector.
- Set the oscilloscope to H. rate.
- Set the AGC switch to LOW (Middle) position.
- Adjust VR1 (YH) so that the waveform is 0.7 ± 0.05V from the blanking level to the top step of the gray scale waveform. (Fig. 5-2-12)

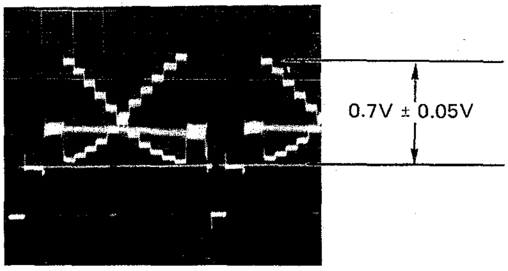


Fig. 5-2-12

(16) Chroma gain adjustment

Test point : **TP1 (C GAIN)** **Process Sub board**
Adjust : **VR11 (C GAIN)** **Process Sub board**

- Aim the camera at the chroma chip chart.
- Connect the oscilloscope to TP1 (C GAIN) of process sub board.
- Set the AGC switch to Low (middle) position.
- Adjust VR11 (C GAIN) so that the burst signal is 0.22 ± 0.01Vp-p. (Fig. 5-2-14)

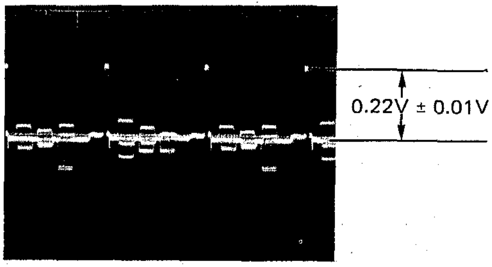


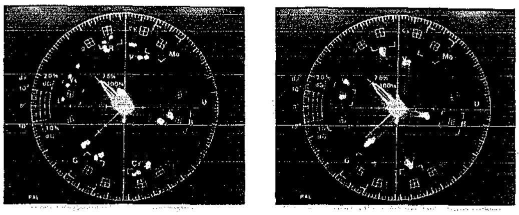
Fig. 5-2-14

- Set the AGC Selection Switch to OFF position.

(17) Chroma flicker adjustment

Test point : **Video Out**
Adjust : **VR2 (C. Flicker)** **Process Sub board**

- Connect the Video Output connector to vectorscope.
- Aim the camera at the chroma chip chart.
- Set the PAL/NTSC mode select switch of vectorscope to NTSC mode.
- Adjust VR2 (C Flicker) so that the chroma flicker become minimum. (Fig. 5-2-15)



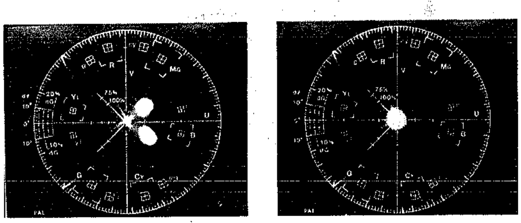
NO GOOD **GOOD**

Fig. 5-2-15

(18) R-Y, B-Y carrier balance

Test point : **Video out**
Adjust : **VR9 (R-Y)** **Process Sub board**
VR10 (B-Y) **Process Sub board**

- Cap on the lens.
- Connect the Video Out Connector to vectorscope.
- Connect TP3 (AUTO PRESET) of Microprocessor Board to Ground.
- Adjust the VR9 (R-Y) so that the vector positions at the center of the vectorscope.
- Disconnect TP3 (AUTO PRESET) from Ground.
- Adjust the VR10 (B-Y) so that the vector positions at the center of the vectorscope. (Fig. 5-2-16)



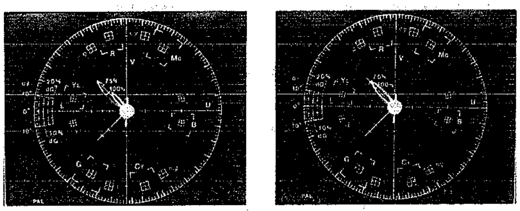
NO GOOD **GOOD**

Fig. 5-2-16

(19) Burst balance adjustment

Test point : **Video Output**
Adjust : **VR1 (Burst QUAD)** **Sync board**

- Aim the camera at the logarithmic gray scale chart.
- Connect the Video Output Connector to vector scope.
- Adjust VR1 (Burst QUAD) so that the two burst level becomes same. (Fig. 5-2-17)



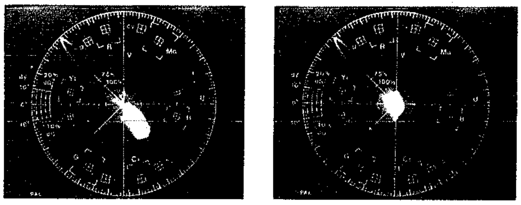
NO GOOD **GOOD**

Fig. 5-2-17

(20) White balance preadjusment

Test point : **Video Output**
Adjust : **VR2 (B Preset)** **Microprocessor board**
VR3 (R Preset) **Microprocessor board**

- Aim the camera at the logarithmic gray scale chart.
- Connect the Video Output Connector to vector scope.
- Connect TP3 (AUTO PRESET) of Microprocessort board to ground.
- Adjust VR2 (B Preset), VR3 (R Preset) so that the vector positions at the center of the vector scope. (fig. 5-2-18)



NO GOOD **GOOD**

5-2-18

- Disconnect TP3 (AUTO PRESET) from Ground.
- Set the PAL/NTSC mode select switch of vectorscope to PAL mode.

(21) Burst gain adjustment

Test point : **Video output**
Adjust : **VR7 (Burst level)** **Process board**

- Cap on the lens.
- Connect the Video output Connector to oscilloscope and terminate the Video output with 75ohm.
- Adjust VR7 (Burst level) so that the burst level becomes 0.3 ± 0.03Vp-p. (Fig. 5-2-19)

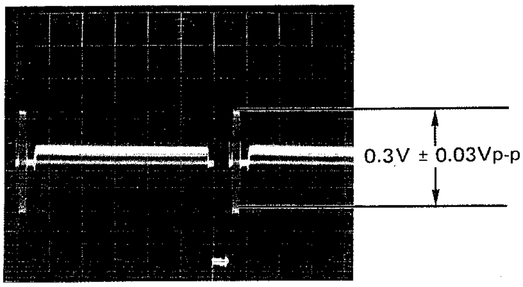


Fig. 5-2-19

(22) Burst reference phase adjustment

Test point : **Video Output**
Adjust : **VR9** **Process board**
(BURST REFERENCE PHASE)

- Mount the RCU adaptor WV-AD37 on the camera unit.
- Supply the DC power to the RCU adaptor using the remote control unit (RCU) WV-RC35 or an external +12V power source.

- Set the DC Power Selection Switch on the left side of camera to the EXT position.
- Connect the Video Output Connector of the RCU adaptor to the colour video monitor through the B input connector of vectorscope.
- Supply the colour bar or black burst signal to the Gen-lock input connector of the RCU adaptor through the B input connector of vectorscope. (Fig. 5-2-20)

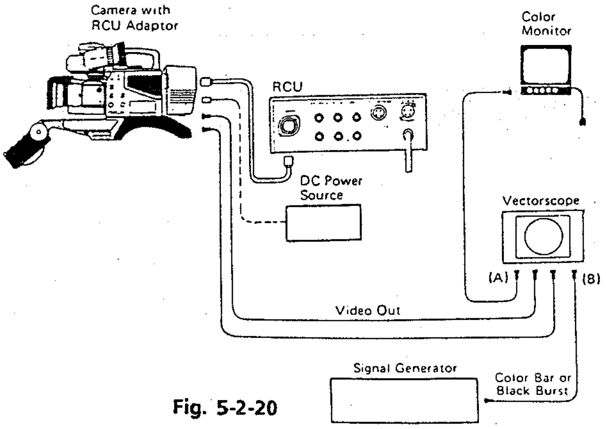


Fig. 5-2-20

- Select the A input signal on the vectorscope and lock the vector by the B input signal.
- Set the Colour Bar/Camera Selection Switch on the RCU adaptor to the BAR position.
- Adjust the Phase Control of the vectorscope so that the burst vectors position on the burst axes of the vectorscope and note the phase of the burst vectors. (Fig. 5-2-21)

  Note : Do not touch the Phase Control of the vectorscope until the adjustment of VR9 (BURST REFERENCE PHASE) is completed.

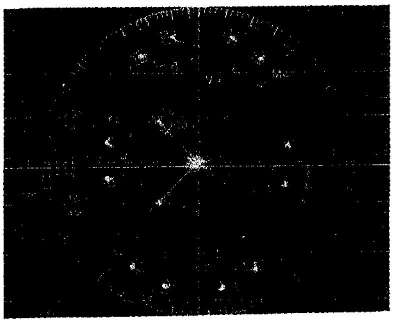
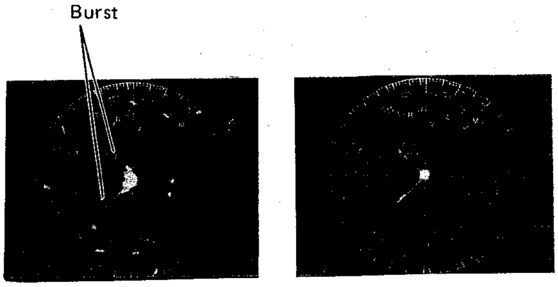


Fig. 5-2-21

- Set the Color Bar/Camera Selection Switch on the RCU adaptor to the CAMERA position.
- Adjust VR9 (BURST REFERENCE PHASE) on the VIC1 of the Process board so that the burst vectors position on the noted position on the vectorscope. (Fig. 5-2-22)



NOGOOD **GOOD**

Fig. 5-2-22

(23) Chroma adjustment

Test point :	**Video output**	
Adjust :	**VR5 (Chroma clip)**	**Process board**
	VR6 (YL chroma level)	**Process board**
	VR7 (B-Y Phase)	**Process Sub board**
	VR8 (R-Y Gain)	**Process Sub board**

- Connect the Video output connector to the vector scope.
- Connect TP3 (AUTO RESET) of Microprocessor Board to Ground.
- Aim the camera at the colour chip chart.
- Set the PAL/NTSC mode select switch on the vectorscope to NTSC mode.
- Turn VR5 (chroma clip) fully counterclockwise to release the chroma clipping.
- Adjust VR6 (YL Chroma Gain) so that the yellow chroma level of yellow vector become 146 ± 5% as compares to the burst vector. (Fig. 5-2-23)

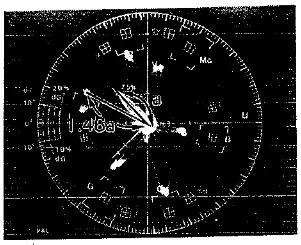


Fig. 5-2-23

- Adjust VR8 (R-Y Gain) so that the red chroma level of red vector become 175 ± 2% as compares to the burst vector. (Fig. 5-2-24)

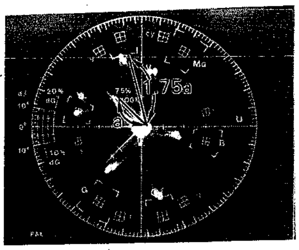


Fig. 5-2-24

- Adjust VR7 (B-Y phase) so that the red chroma phase of red vector become 106 ± 1° as compares to the burst vector. (Fig. 5-2-25)

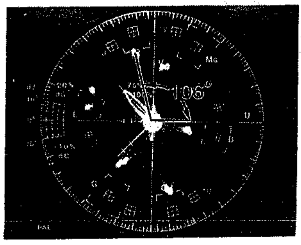


Fig. 5-2-25

- Repeat above adjustment until they are set to specified levels.
- Connect the Video output connector to the oscilloscope.
- Set the oscilloscope to H. rate.
- Aim the camera at the logarithmic gray scale chart.
- Set the AGC switch of the camera to OFF position.
- Set the lens iris to fully open by the lens iris VR.
- Adjust VR5 (Chroma clip) so that the carrier leak level of over 0.7V becomes minimum. (Fig. 5-2-26)

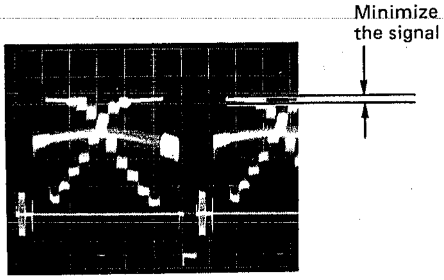


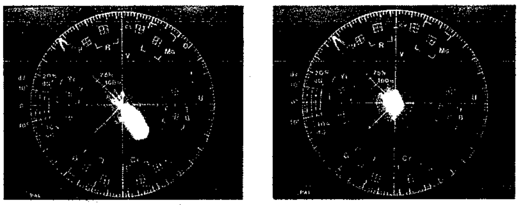
Fig. 5-2-26

- Cap on the lens over two seconds, and suddenly cap off the lens. If the signal of over 0.7V has carrier leak when the time just after cap off the lens, adjust VR5 again.

(25) White balance adjustment

Test point :	**Video output**	
Adjust :	**VR2 (B Preset)**	**Microprocessor board**
	VR3 (R Preset)	**Microprocessor board**

- Connect the Video output connector to the vectorscope.
- Set the AGC switch of the camera to Low (Middle) position.
- Connect TP3 (AUTO PRESET) of Microprocessor Board to Ground.
- Aim the camera at the white chart.
- Adjust VR2 (B Preset) and VR3 (R Preset) so that the vector on the vectorscope positions at center of vectorscope. (Fig. 5-2-28)



NO GOOD GOOD

Fig. 5-2-28

- Set the AGC switch of the camera to OFF position.
- Disconnect TP3 (AUTO PRESET) from Ground.

(26) ATW R, B adjustment

Test point :	**Video out**	
Adjust :	**VR1 (ATW B Preset)**	**Process board**
	VR2 (ATW R Preset)	**Process board**
	VR3 (ATW R Gain)	**Process board**
	VR4 (ATW BGain)	**Process board**

- Connect the Video output connector to the vectorscope.
- Connect TP2 of Microprocessor board and TP4 of Microprocessor board.
- Set the ATW/AWC switch to ATW position.
- Aim the camera at the white chart.
- Slowly adjust VR1 (ATW B preset) and VR2 (ATW R preset) so that the vector on the vector scope positions at the center of vectorscope. (Fig. 5-2-28)
- Set the colour temperature conversion filter which converts from 3,200°k to 5,200°k in front of the lens and faceplate of ATW sensor.

  Note : If there is no colour conversion filter, the ATW sensor gain can roughly be adjusted by using the outdoor light.
- Adjust VR3 (ATW R gain) and VR4 (ATW B gain) so that the vector on the vectorscope positions at the center of vectorscope. (Fig. 5-2-28)
- Disconnect TP2 of Microprocessor board and TP4 of Microprocessor board.

(29) Low light detect level adustment

Test point :	**Video out**	
Observe :	**1' Electronic view finder (WV-VF02)**	
Adjust :	**VR4 (Low light level)**	**Drive board**

- Connect the 1″ electoronic view finder to the camera unit.
- Connect the Video output connector to the oscilloscope.
- Set the AGC switch to HIGH (U pper) position.
- Aim the camera at the logarithmic gray scale chart.
- Set the lens iris so that the level of video output becomes 350mV.

- Adjust VR4 (Low light level) so that the 1″ EVF as shown just appear the warning indication display.
- Set to AGC switch to OFF position.

(30) Zebra level indicator adjustment

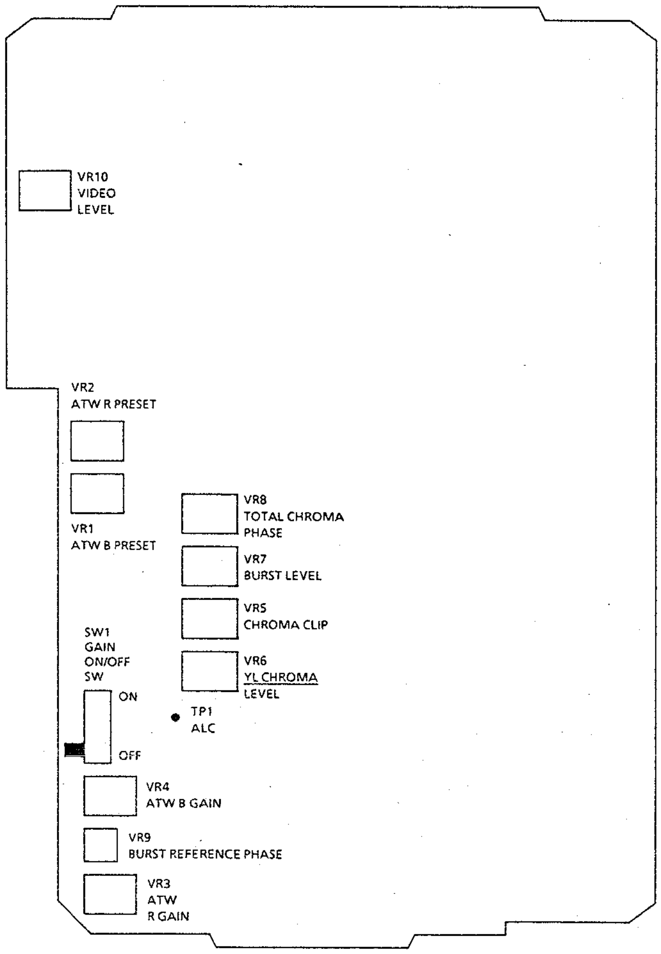
Test point : **Video out**
Observe : **1′ Electronic view finder (WV-VF02)**
Adjust : **VR2 (Zebra level) SYNC board.**

- Connect the 1″ electronic view finder to the camera unit.
- Connect the Video output connector to the oscilloscope.
- Aim the camera at the logarithmic gray scale chart.
- Set the lens iris so that the level of video output becomes 700mV.
- Adjust VR2 (Zebra level) so that the white chip (top step) of the gray scale turns into ZEBRA pattern on the 1″ EVF.

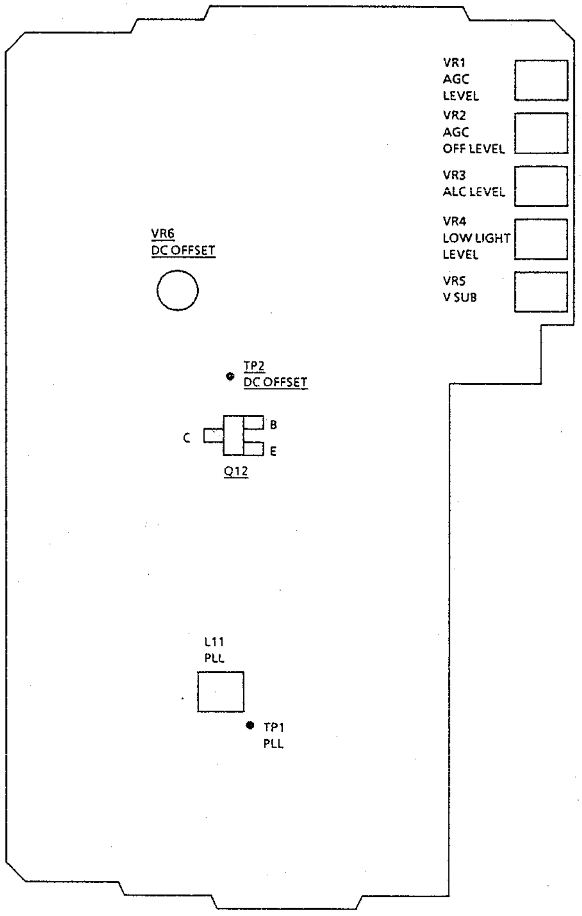
LOCATION OF TEST POINTS AND ADJUSTING CONTROLS

— Component Side —

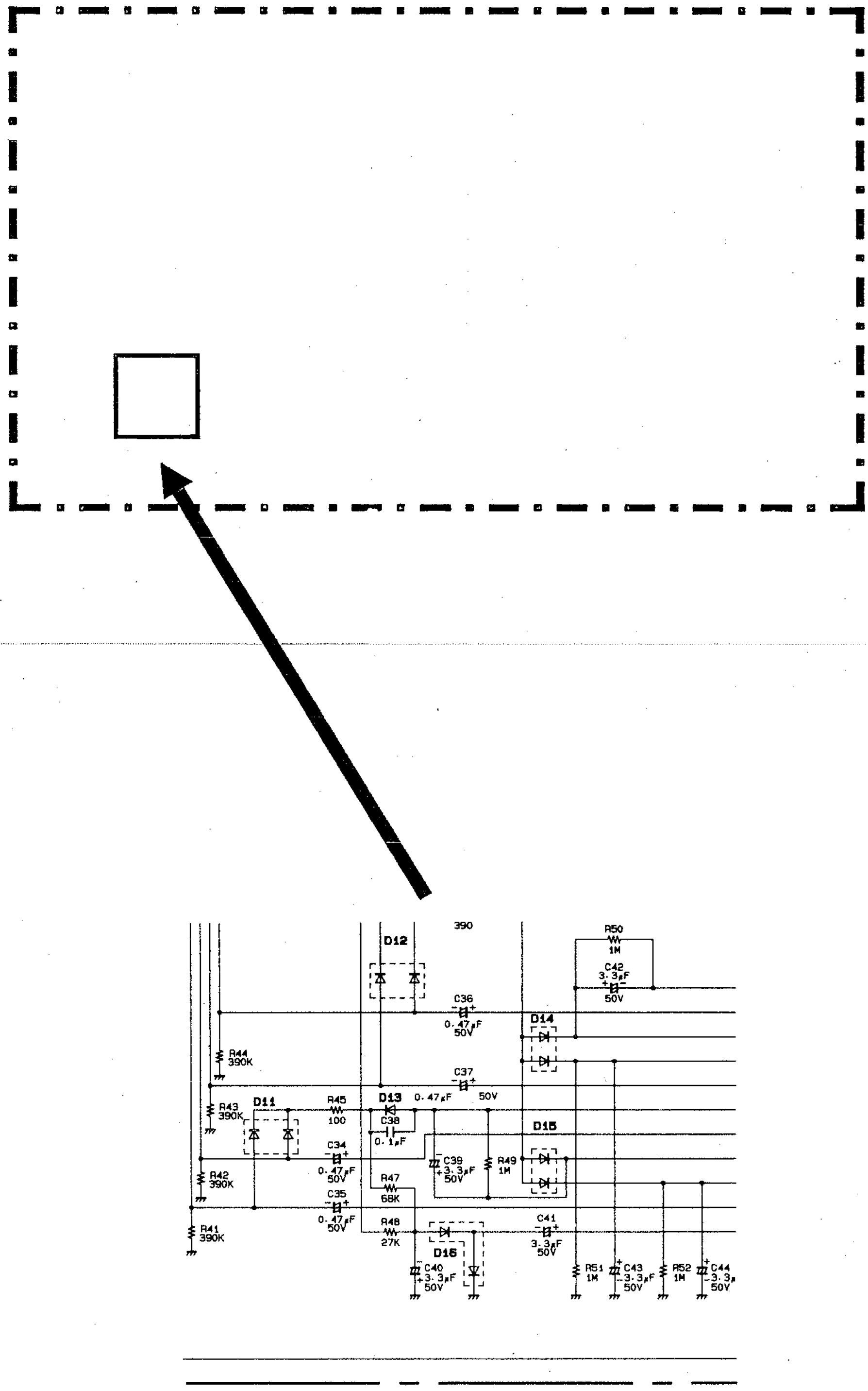
PROCESS BOARD


VR10
VIDEO
LEVEL
VR2
ATW R PRESET
VR1
ATW B PRESET
VR8
TOTAL CHROMA
PHASE
VR7
BURST LEVEL
VR5
CHROMA CLIP
SW1
GAIN
ON/OFF
SW
VR6
YL CHROMA
LEVEL
ON
TP1
ALC
OFF
VR4
ATW B GAIN
VR9
BURST REFERENCE PHASE
VR3
ATW
R GAIN

DRIVE BOARD


VR1
AGC
LEVEL
VR2
AGC
OFF LEVEL
VR3
ALC LEVEL
VR4
LOW LIGHT
LEVEL
VR5
V SUB
VR6
DC OFFSET
TP2
DC OFFSET
C
B
E
Q12
L11
PLL
TP1
PLL

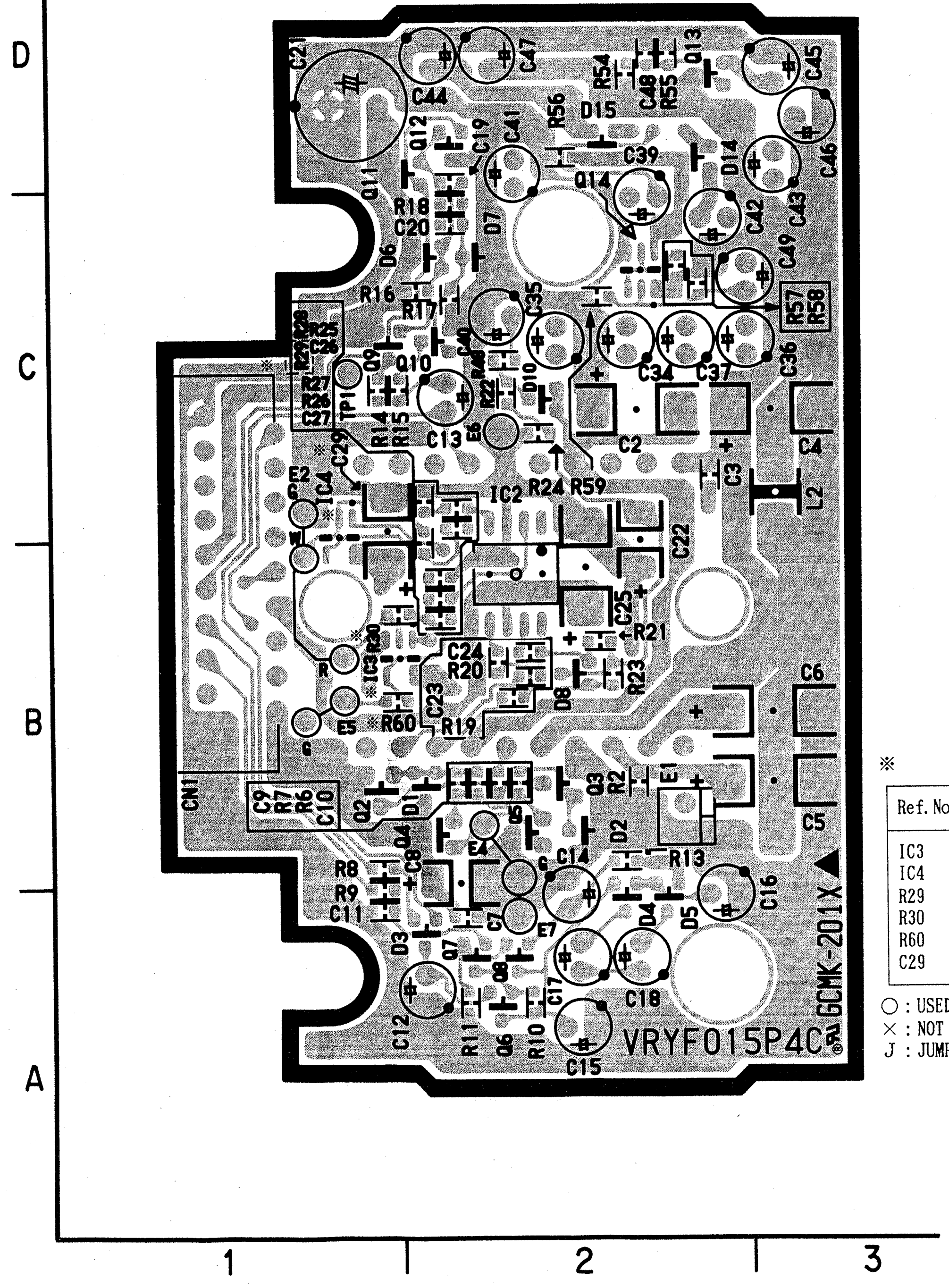
SCHEMATIC DIAGRAM OF SENSOR BOARD


390
D12
R50
1M
C42
3.3μF
50V
C36
0.47μF
50V
D14
R44
390K
C37
D13
0.47μF
50V
R43
390K
D11
R45
100
C38
0.1μF
D15
C34
0.47μF
50V
C39
3.3μF
50V
R49
1M
R42
390K
R47
68K
C35
0.47μF
50V
R41
390K
R48
27K
C41
3.3μF
50V
D16
C40
3.3μF
50V
R51
1M
C43
3.3μF
50V
R52
1M
C44
3.3μ
50V

Suppl

CONDUCTOR VIEW OF SENSOR BOARD

SENSOR BOARD (COMPONENT SIDE VIEW)


D
C
B
A
1
2
3
VRYF015P4C
GCMK-201X
CN1
IC2
IC3
IC4
C2
C4
C5
C6
L2

<Index>

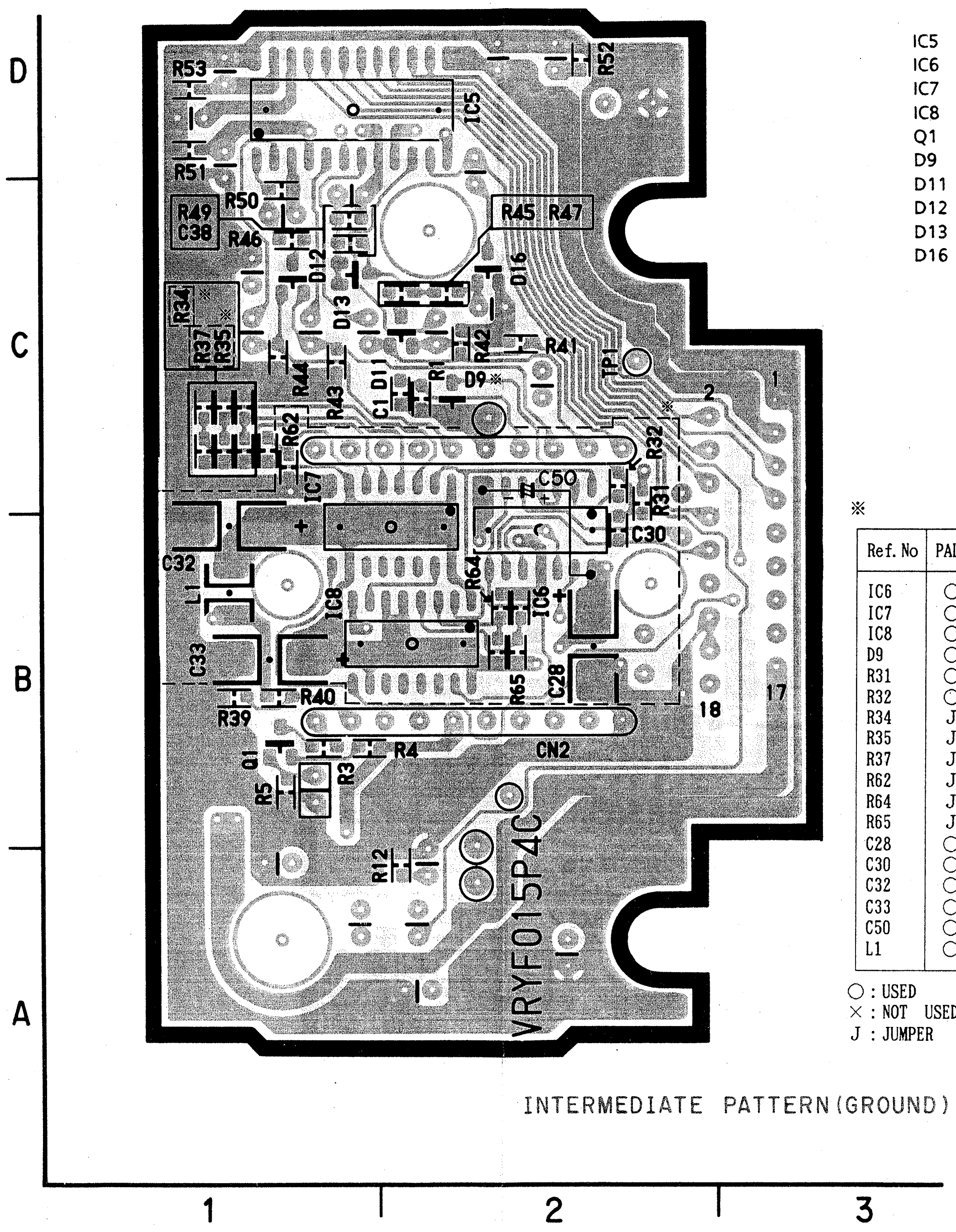
IC2	B2
IC3	B1, B2
IC4	B1
Q2	B1
Q3	B2
Q4	B2
Q5	B2
Q6	A2
Q7	A2
Q8	A2
Q9	C2
Q10	C2
Q11	D1
Q12	D2
Q13	D2
D14	C2
D1	B2
D2	B2
D3	A2
D4	A2
D5	A2
D6	C2
D7	C2
D8	B2
D10	C2
D14	D2
D15	D2

※

Ref. No	PAL	NTSC
IC3	○	×
IC4	○	×
R29	×	J
R30	×	J
R60	J	×
C29	○	×

○ : USED
× : NOT USED
J : JUMPER

SENSOR BOARD (PATTERN SIDE VIEW)


D
C
B
A
1
2
3
VRYF015P4C
CN2
IC5
IC6
IC7
IC8
INTERMEDIATE PATTERN (GROUND)

<Index>

IC5	D1, D2
IC6	B2
IC7	B1, B2
IC8	B1, B2
Q1	B1
D9	D2
D11	C2
D12	C1
D13	C1
D16	C2

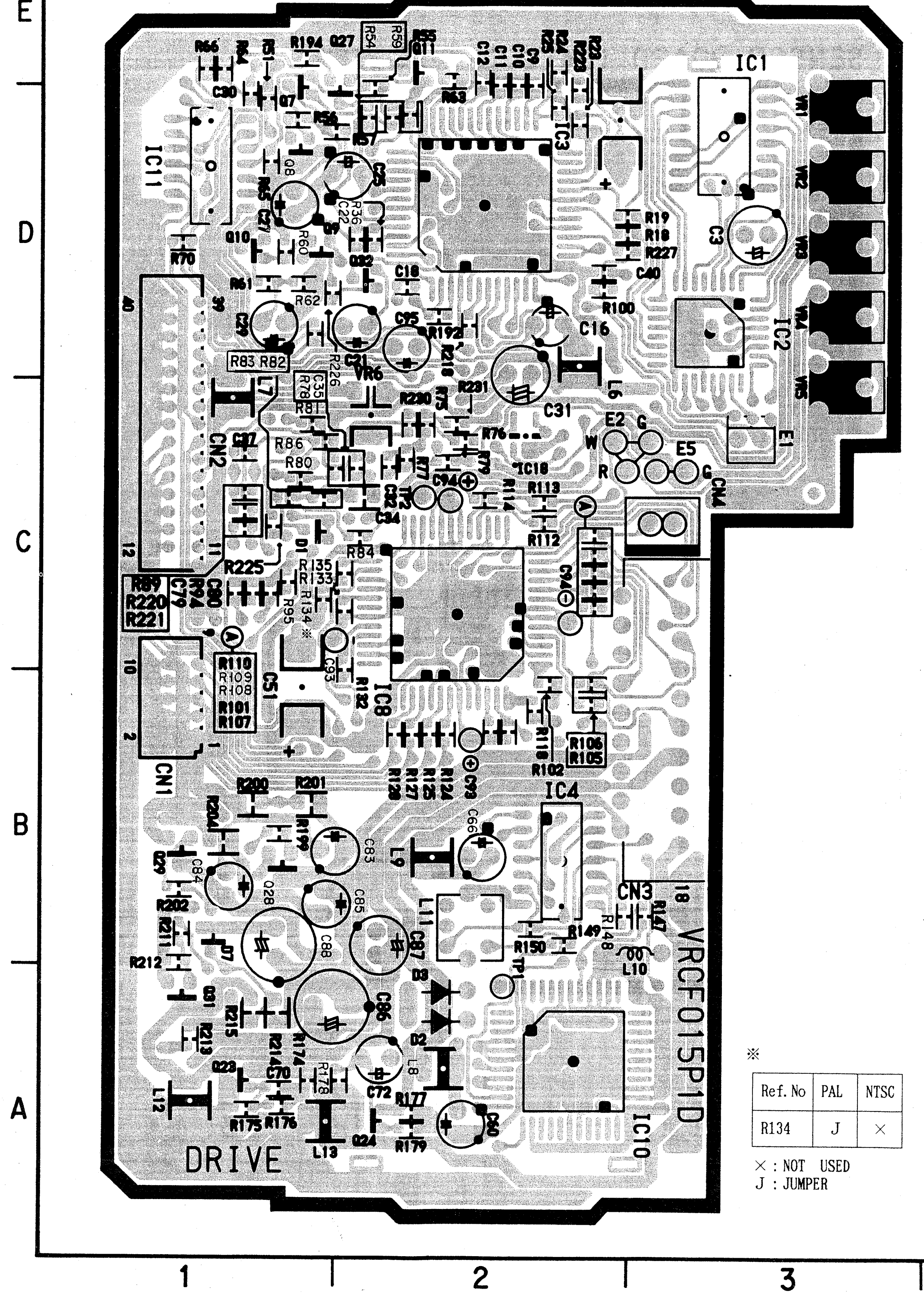
※

Ref. No	PAL	NTSC
IC6	○	×
IC7	○	×
IC8	○	×
D9	○	×
R31	○	×
R32	○	×
R34	J	×
R35	J	×
R37	J	×
R62	J	×
R64	J	×
R65	J	×
C28	○	×
C30	○	×
C32	○	×
C33	○	×
C50	○	×
L1	○	×

○ : USED
× : NOT USED
J : JUMPER

CONDUCTOR VIEW OF DRIVE BOARD

DRIVE BOARD (COMPONENT SIDE VIEW)


E
D
C
B
A
1
2
3
IC1
IC2
IC4
IC8
IC10
IC11
CN1
CN2
CN3
CN4
VRCF015P1D
DRIVE

<Index>

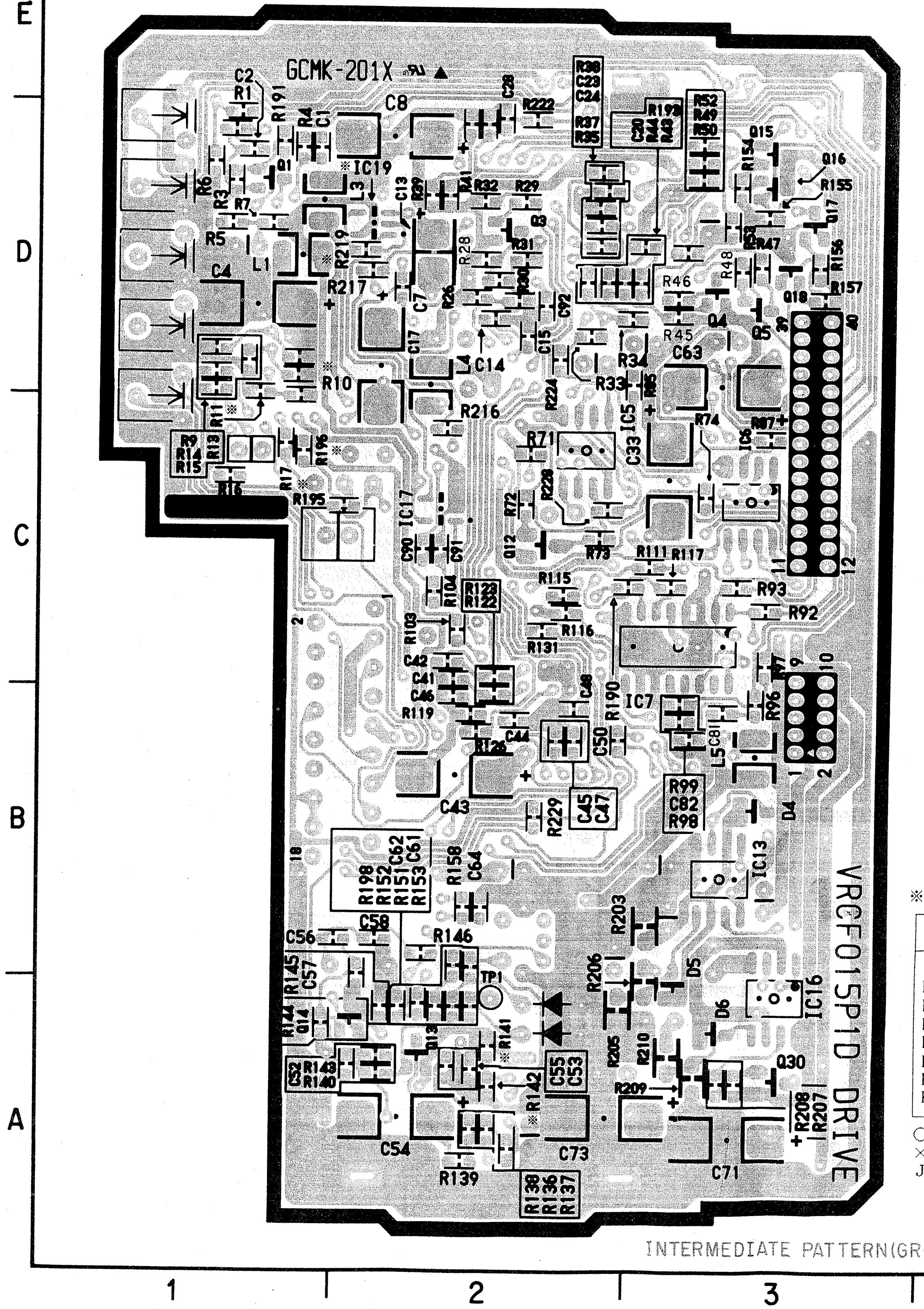
IC1	D3
IC2	D3
IC3	D2
IC4	B2
IC8	C2
IC10	A2
IC11	D1
IC18	C2
Q7	D1
Q8	D1
Q9	D1
Q10	D1
Q11	D2
Q23	A1
Q24	A2
Q27	D1
Q28	B1
Q29	B1
Q31	A1
Q32	D2
D1	C1
D2	A2
D3	A2
D7	B1

※

Ref. No	PAL	NTSC
R134	J	×

× : NOT USED
J : JUMPER

DRIVE BOARD (PATTERN SIDE VIEW)


E
D
C
B
A
1
2
3
GCMK-201X
IC5
IC7
IC13
IC16
IC17
IC19
VRCF015P1D DRIVE

INTERMEDIATE PATTERN(GROUND)

<Index>

IC5	C2
IC6	C3
IC7	C3
IC13	B3
IC16	A3
IC17	C2
IC19	D2
Q1	D1
Q3	D2
Q4	D3
Q5	D3
Q12	C2
Q13	A2
Q14	A2
Q15	D3
Q16	D3
Q17	D3
Q18	D3
Q30	A3
D4	B3
D5	A3
D6	A3

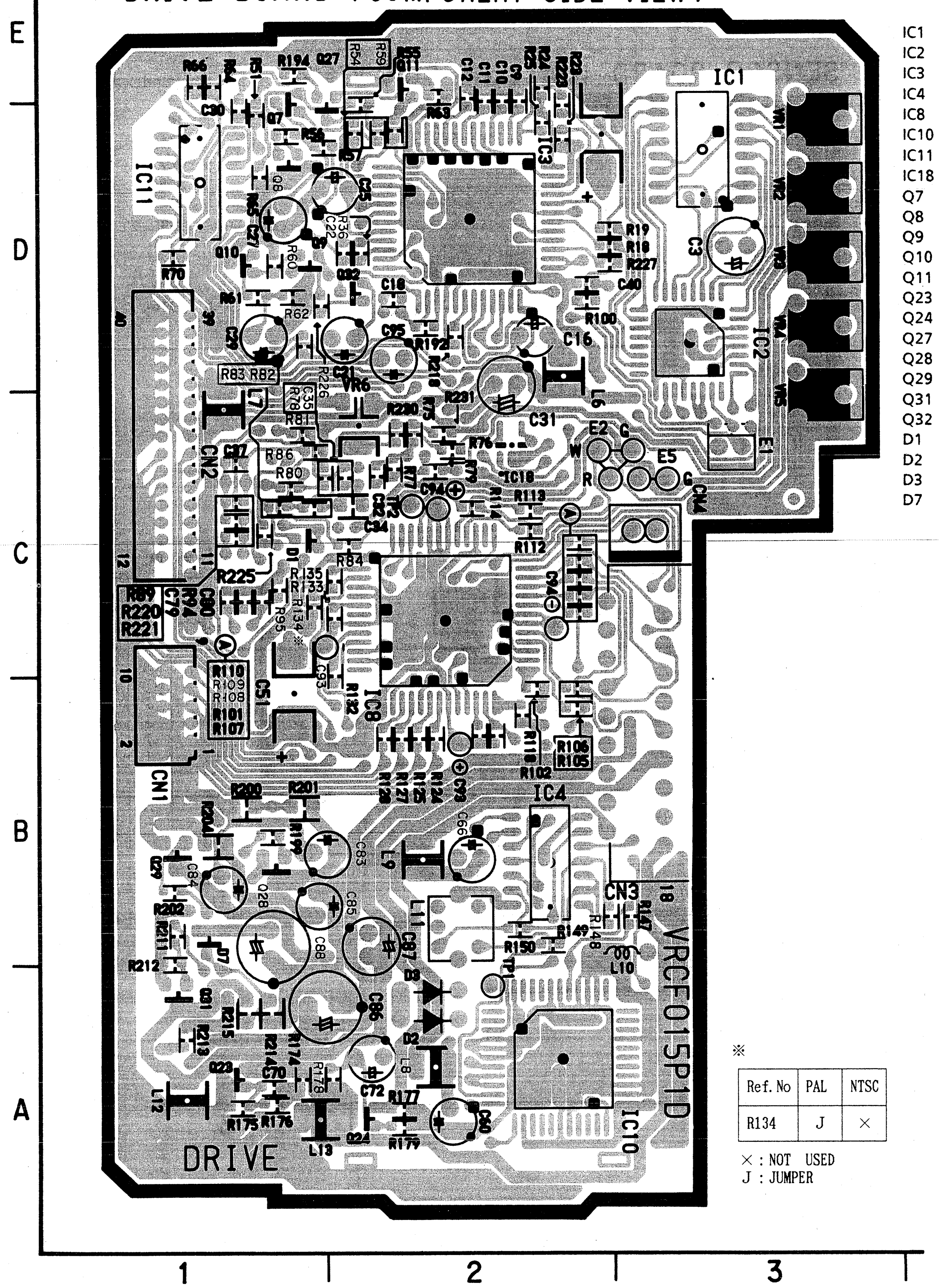
※

Ref. No	PAL	NTSC
IC19	○	×
R10	J	×
R11	×	J
R141	J	×
R142	×	J
R195	J	×
R196	×	J
R219	×	J

○ : USED
× : NOT USED
J : JUMPER

CONDUCTOR VIEW OF DRIVE BOARD

DRIVE BOARD (COMPONENT SIDE VIEW)


E
D
C
B
A
1
2
3
IC1
IC2
IC4
IC8
IC10
IC11
CN1
CN2
CN3
VRCF015P1D
DRIVE

<Index>

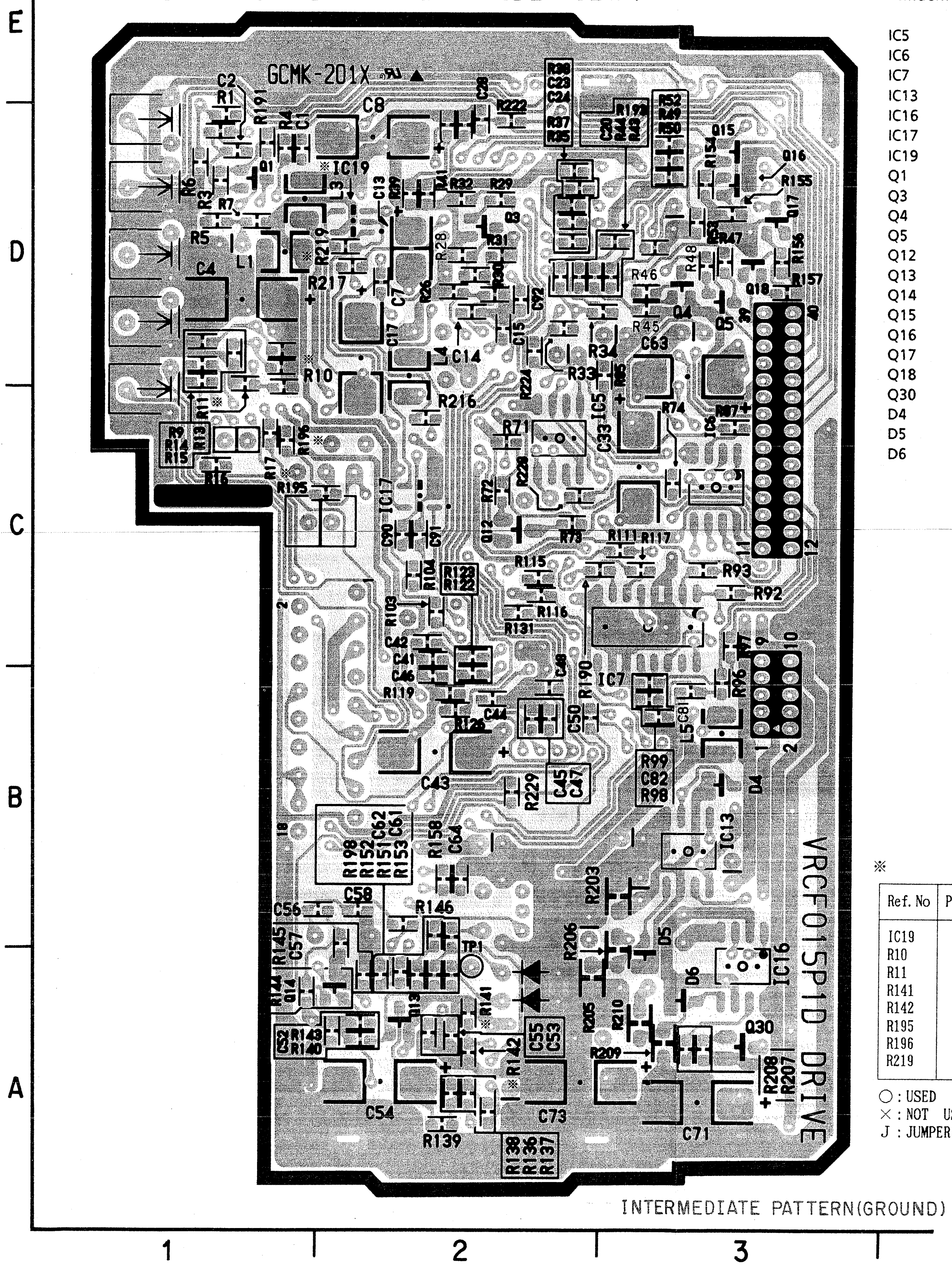
IC1	D3
IC2	D3
IC3	D2
IC4	B2
IC8	C2
IC10	A2
IC11	D1
IC18	C2
Q7	D1
Q8	D1
Q9	D1
Q10	D1
Q11	D2
Q23	A1
Q24	A2
Q27	D1
Q28	B1
Q29	B1
Q31	A1
Q32	D2
D1	C1
D2	A2
D3	A2
D7	B1

※

Ref. No	PAL	NTSC
R134	J	×

× : NOT USED
J : JUMPER

DRIVE BOARD (PATTERN SIDE VIEW)


E
D
C
B
A
1
2
3
GCMK-201X
IC19
IC7
IC13
IC16
VRCF015P1D DRIVE
INTERMEDIATE PATTERN(GROUND)

<Index>

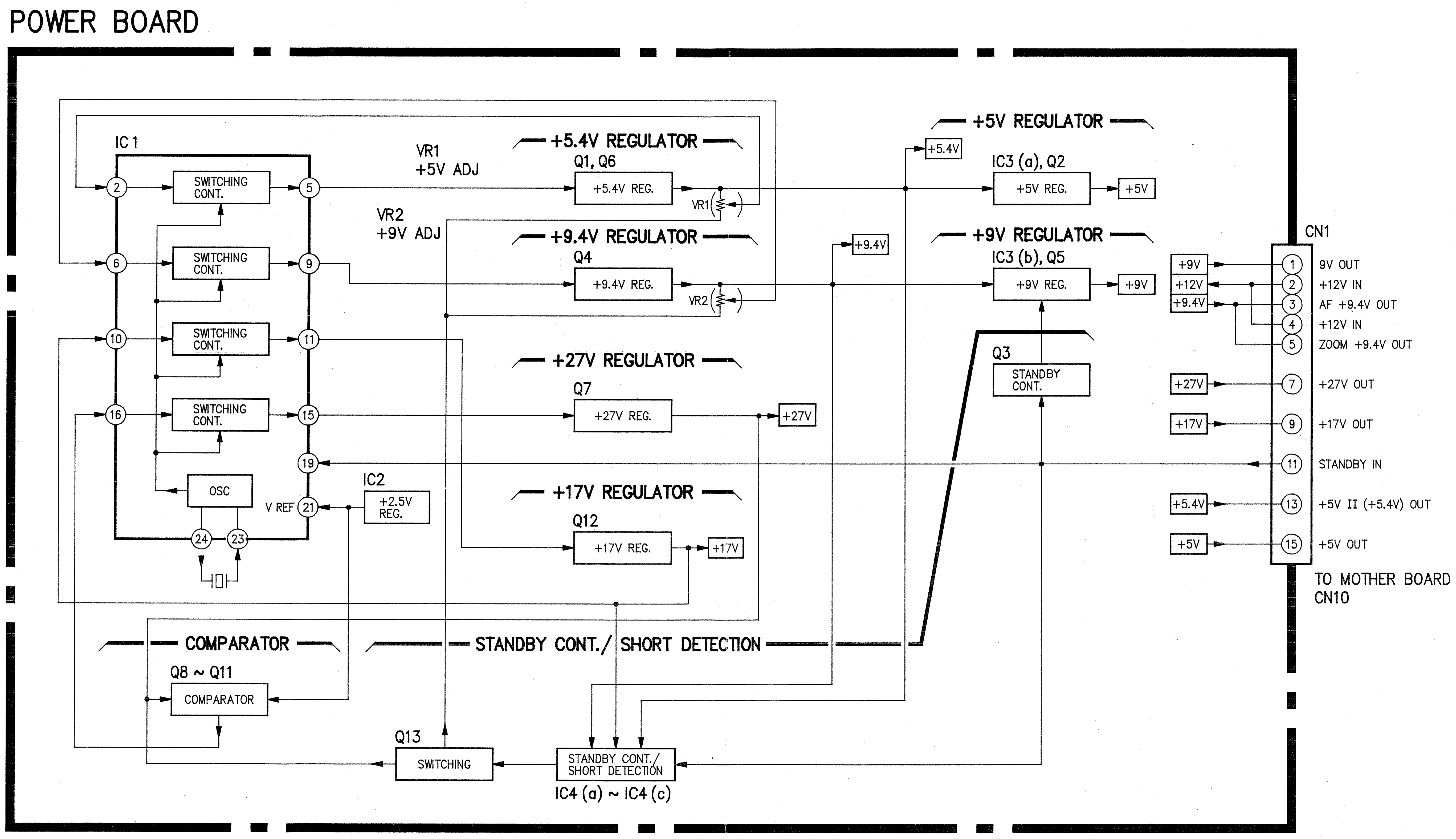
IC5	C2
IC6	C3
IC7	C3
IC13	B3
IC16	A3
IC17	C2
IC19	D2
Q1	D1
Q3	D2
Q4	D3
Q5	D3
Q12	C2
Q13	A2
Q14	A2
Q15	D3
Q16	D3
Q17	D3
Q18	D3
Q30	A3
D4	B3
D5	A3
D6	A3

※

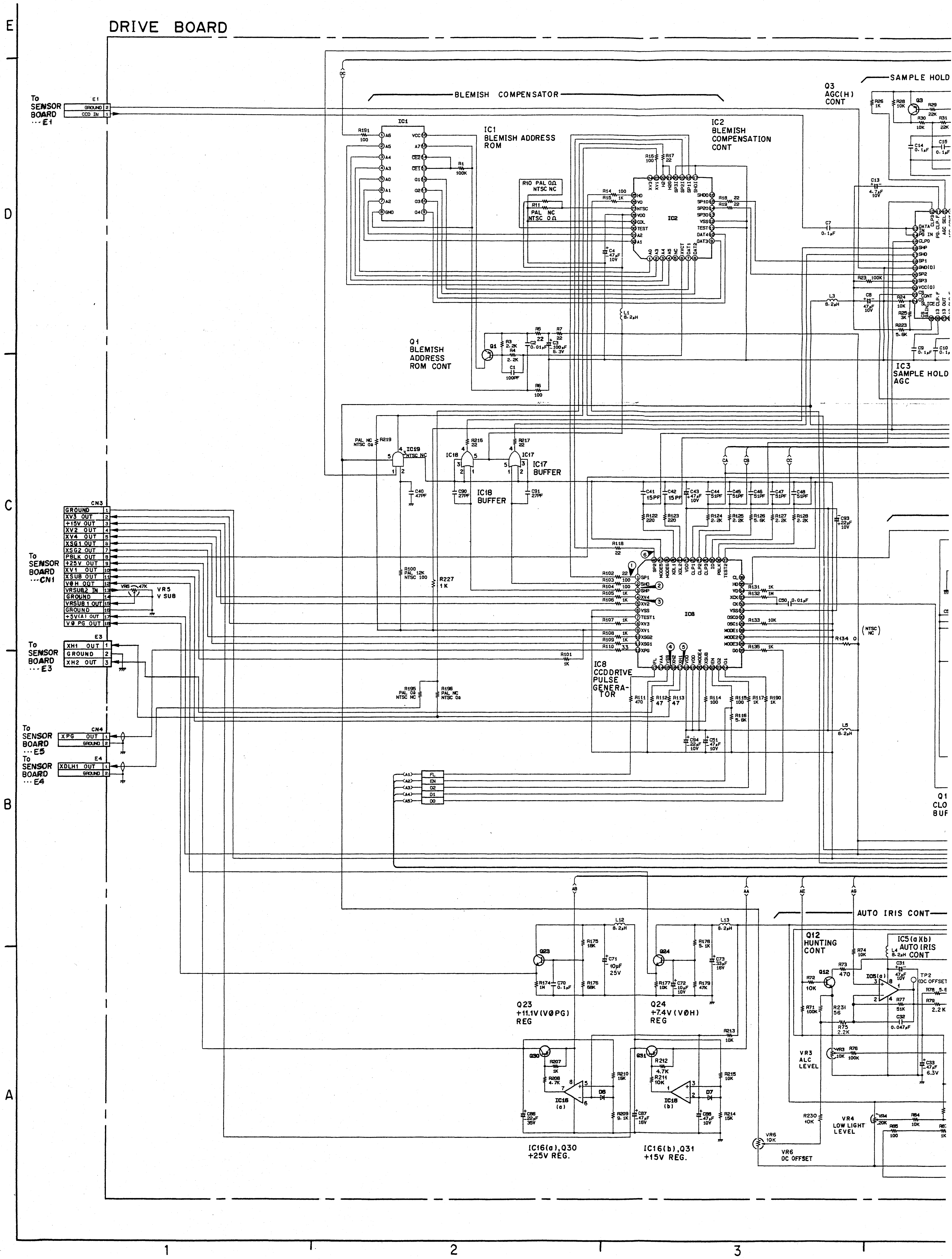
Ref. No	PAL	NTSC
IC19	○	×
R10	J	×
R11	×	J
R141	J	×
R142	×	J
R195	J	×
R196	×	J
R219	×	J

○ : USED
× : NOT USED
J : JUMPER

BLOCK DIAGRAM OF POWER BOARD

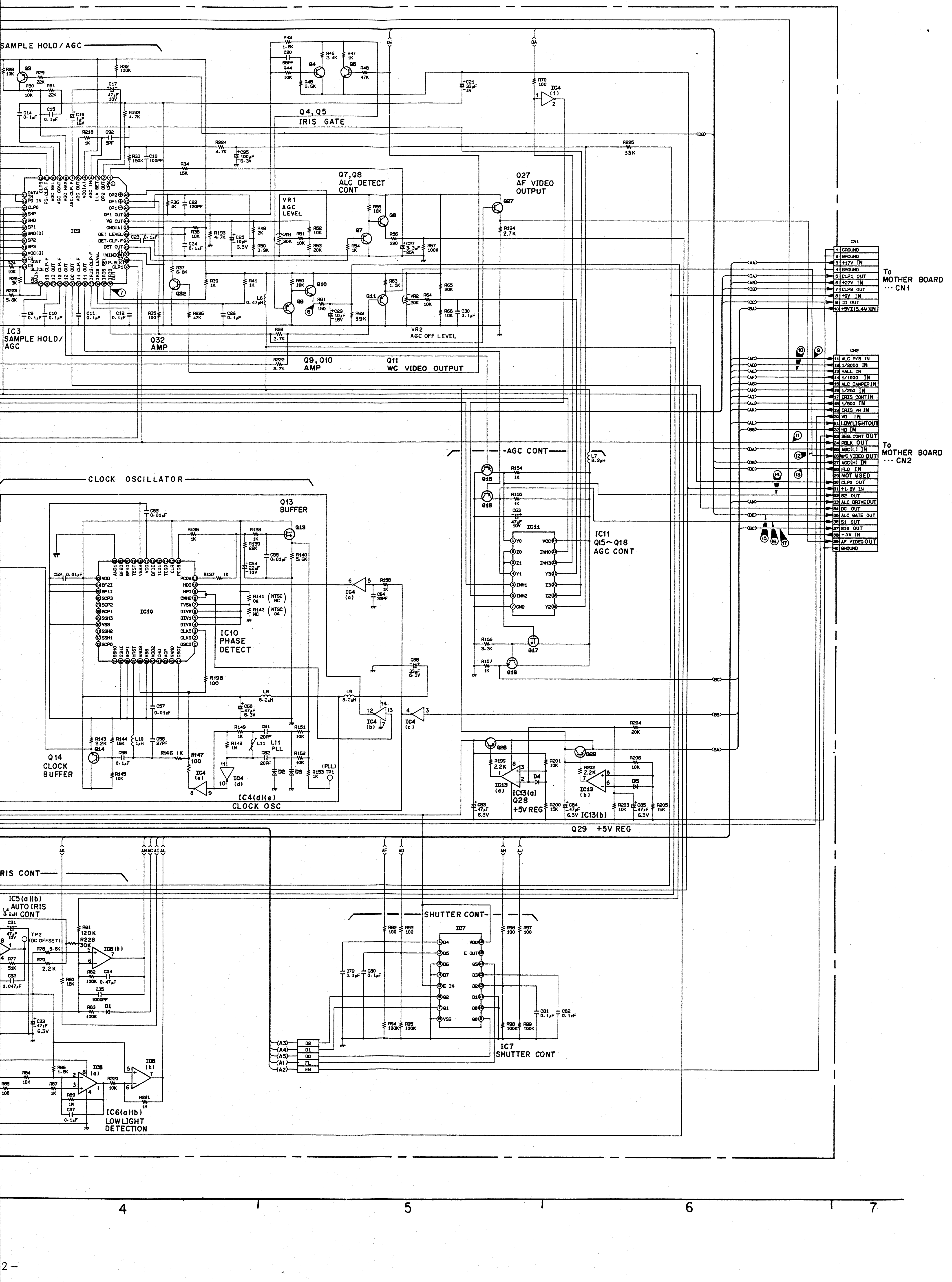

POWER BOARD
IC 1
SWITCHING CONT.
SWITCHING CONT.
SWITCHING CONT.
SWITCHING CONT.
OSC
V REF
2
5
6
9
10
11
16
15
19
21
24
23
VR1
+5V ADJ
VR2
+9V ADJ
+5.4V REGULATOR
Q1, Q6
+5.4V REG.
VR1
+9.4V REGULATOR
Q4
+9.4V REG.
VR2
+27V REGULATOR
Q7
+27V REG.
+27V
IC2
+2.5V REG.
+17V REGULATOR
Q12
+17V REG.
+17V
+5V REGULATOR
+5.4V
IC3 (a), Q2
+5V REG.
+5V
+9V REGULATOR
+9.4V
IC3 (b), Q5
+9V REG.
+9V
Q3
STANDBY CONT.
COMPARATOR
Q8 ~ Q11
COMPARATOR
STANDBY CONT./ SHORT DETECTION
Q13
SWITCHING
STANDBY CONT./ SHORT DETECTION
IC4 (a) ~ IC4 (c)
CN1
+9V
+12V
+9.4V
+27V
+17V
+5.4V
+5V
1
9V OUT
2
+12V IN
3
AF +9.4V OUT
4
+12V IN
5
ZOOM +9.4V OUT
7
+27V OUT
9
+17V OUT
11
STANDBY IN
13
+5V II (+5.4V) OUT
15
+5V OUT
TO MOTHER BOARD CN10

SCHEMATIC DIAGRAM

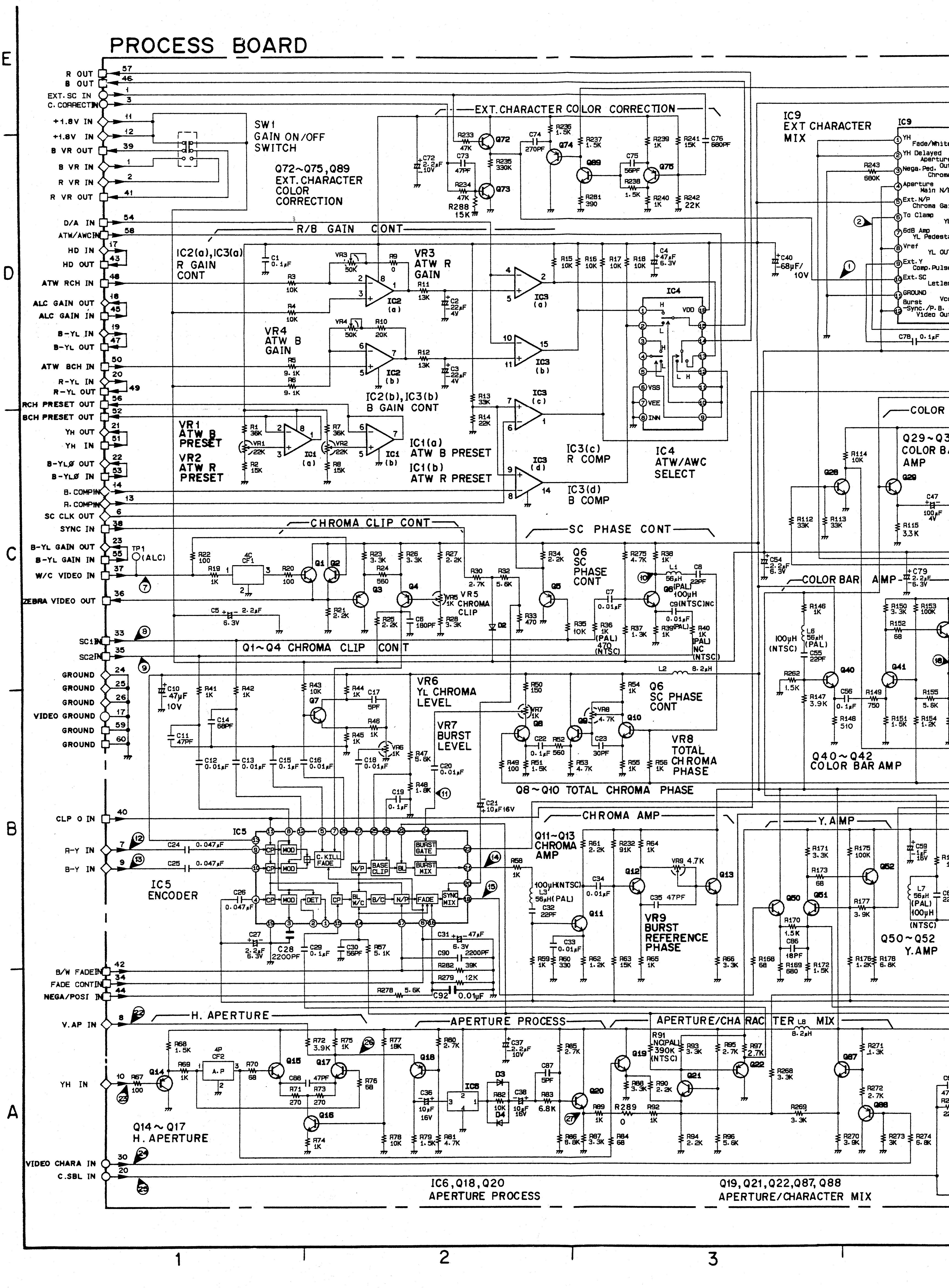

DRIVE BOARD
E
D
C
B
A
1
2
3
To SENSOR BOARD …E1
E1
GROUND
CCD IN
To SENSOR BOARD …CN1
CN3
GROUND
XV3 OUT
+15V OUT
XV2 OUT
XV4 OUT
XSG1 OUT
XSG2 OUT
PBLK OUT
+25V OUT
XV1 OUT
XSUB OUT
VØH OUT
VRSUB2 IN
GROUND
VRSUB1 OUT
GROUND
+5V(A) OUT
VØ PG OUT
VR5 V SUB
To SENSOR BOARD …E3
E3
XH1 OUT
GROUND
XH2 OUT
To SENSOR BOARD …E5
CN4
XPG OUT
GROUND
To SENSOR BOARD …E4
E4
XDLH1 OUT
GROUND
BLEMISH COMPENSATOR
IC1
IC1 BLEMISH ADDRESS ROM
IC2 BLEMISH COMPENSATION CONT
Q1 BLEMISH ADDRESS ROM CONT
IC2
R10 PAL 0Ω NTSC NC
R11 PAL NC NTSC 0Ω
IC19
IC18
IC17
IC17 BUFFER
IC18 BUFFER
PAL NC NTSC 0Ω
R100 PAL 12K NTSC 100
R227 1K
R195 PAL 0Ω NTSC NC
R196 PAL NC NTSC 0Ω
IC8
IC8 CCD DRIVE PULSE GENERATOR
R134 0 (NTSC NC)
FL
EN
D2
D1
D0
Q3 AGC(H) CONT
SAMPLE HOLD
IC3 SAMPLE HOLD AGC
Q1 CLO BUF
AUTO IRIS CONT
Q12 HUNTING CONT
IC5(a)(b) AUTO IRIS CONT
TP2 DC OFFSET
Q23 +11.1V(VØPG) REG
Q24 +7.4V(VØH) REG
IC16(a),Q30 +25V REG.
IC16(b),Q31 +15V REG.
VR3 ALC LEVEL
VR4 LOW LIGHT LEVEL
VR6 DC OFFSET

GRAM OF DRIVE BOARD

Suppl 2

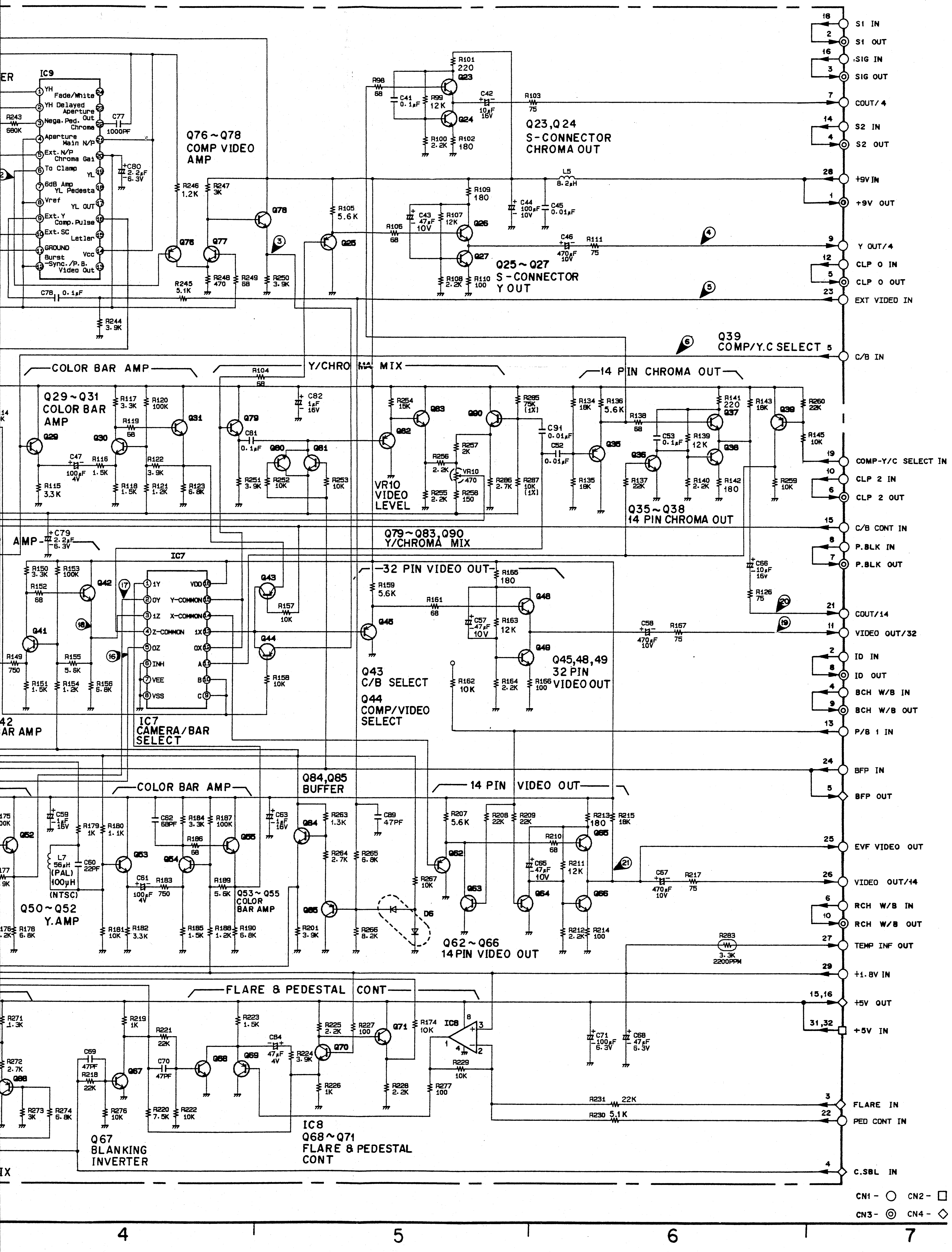

SAMPLE HOLD / AGC
IC3
SAMPLE HOLD/ AGC
Q32
AMP
Q4,Q5
IRIS GATE
Q7,Q8
ALC DETECT CONT
VR1
AGC LEVEL
Q27
AF VIDEO OUTPUT
Q9,Q10
AMP
Q11
WC VIDEO OUTPUT
VR2
AGC OFF LEVEL
CLOCK OSCILLATOR
IC10
PHASE DETECT
Q13
BUFFER
Q14
CLOCK BUFFER
IC4(d)(e)
CLOCK OSC
L11
PLL
-AGC CONT
IC11
Q15~Q18
AGC CONT
IC13(a)
Q28
+5V REG
IC13(b)
Q29 +5V REG
IRIS CONT
IC5(a)(b)
AUTO IRIS
L4 CONT
TP2
(DC OFFSET)
IC6(a)(b)
LOWLIGHT DETECTION
SHUTTER CONT
IC7
SHUTTER CONT
CN1
1 GROUND
2 GROUND
3 +17V IN
4 GROUND
5 CLP1 OUT
6 +27V IN
7 CLP2 OUT
8 +9V IN
9 ID OUT
10 +5VI(5.4V)IN
To MOTHER BOARD ··· CN1
CN2
11 ALC P/B IN
12 1/2000 IN
13 HALL IN
14 1/1000 IN
15 ALC DAMPER IN
16 1/250 IN
17 IRIS CONT IN
18 1/500 IN
19 IRIS VR IN
20 VD IN
21 LOWLIGHTOUT
22 HD IN
23 SES. CONT OUT
24 PBLK OUT
25 AGC(L) IN
26 W/C VIDEO OUT
27 AGC(H) IN
28 FLD IN
29 NOT USED
30 CLP0 OUT
31 +1.8V IN
32 S2 OUT
33 ALC DRIVE OUT
34 DC OUT
35 ALC GATE OUT
36 S1 OUT
37 SIG OUT
38 +5V IN
39 AF VIDEO OUT
40 GROUND
To MOTHER BOARD ··· CN2
4
5
6
7

SCHEMATIC DIAGRAM C



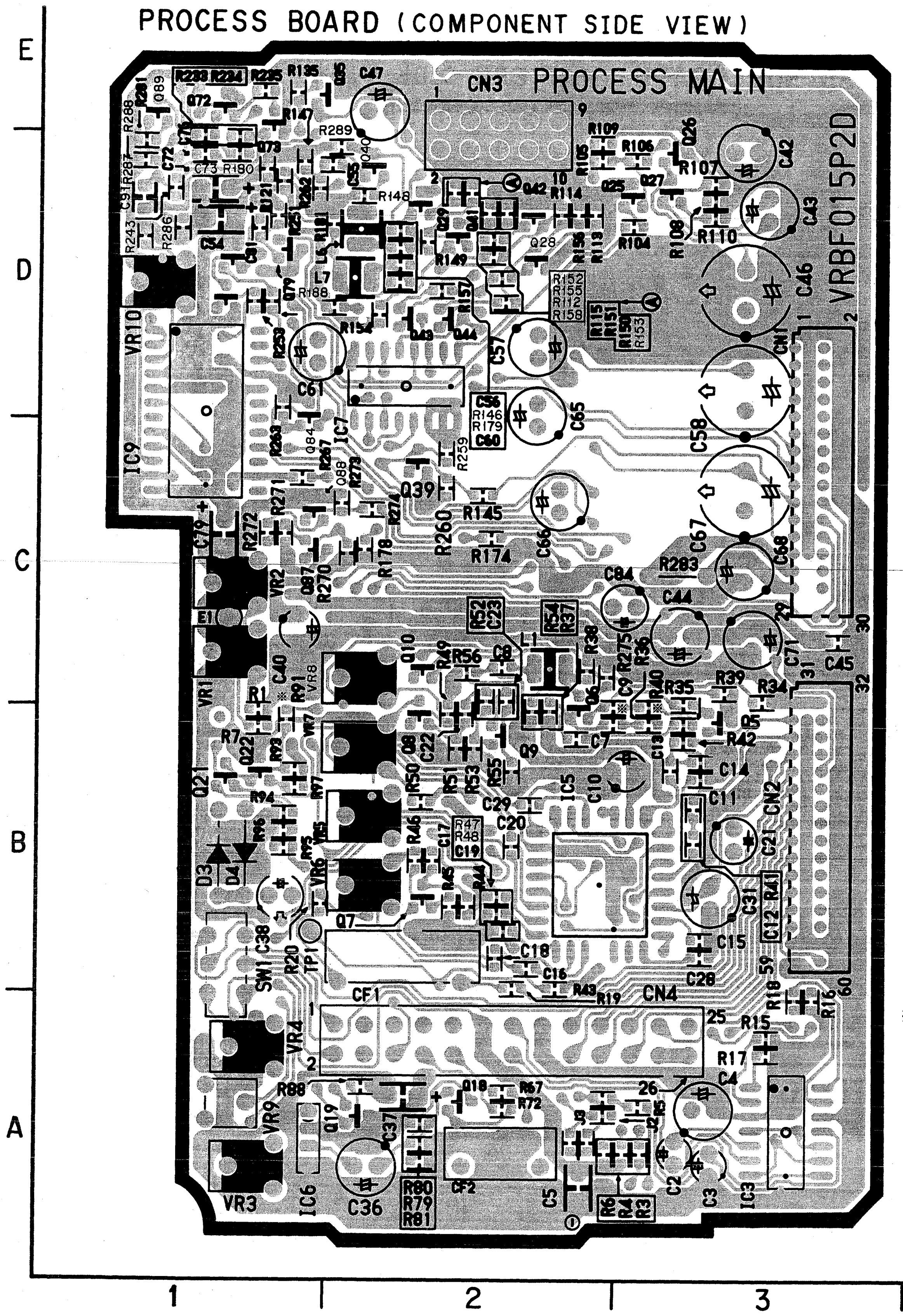
PROCESS BOARD
R OUT
B OUT
EXT. SC IN
C. CORRECTIN
+1.8V IN
+1.8V IN
B VR OUT
B VR IN
R VR IN
R VR OUT
D/A IN
ATW/AWCIN
HD IN
HD OUT
ATW RCH IN
ALC GAIN OUT
ALC GAIN IN
B-YL IN
B-YL OUT
ATW BCH IN
R-YL IN
R-YL OUT
RCH PRESET OUT
BCH PRESET OUT
YH OUT
YH IN
B-YLØ OUT
B-YLØ IN
B. COMPIN
R. COMPIN
SC CLK OUT
SYNC IN
B-YL GAIN OUT
B-YL GAIN IN
W/C VIDEO IN
ZEBRA VIDEO OUT
SC1IN
SC2IN
GROUND
VIDEO GROUND
CLP O IN
R-Y IN
B-Y IN
B/W FADEIN
FADE CONTIN
NEGA/POSI IN
V.AP IN
YH IN
VIDEO CHARA IN
C.SBL IN
SW1 GAIN ON/OFF SWITCH
Q72~Q75,Q89 EXT. CHARACTER COLOR CORRECTION
EXT. CHARACTER COLOR CORRECTION
IC9 EXT CHARACTER MIX
R/B GAIN CONT
IC2(a),IC3(a) R GAIN CONT
VR3 ATW R GAIN
VR4 ATW B GAIN
IC2(b),IC3(b) B GAIN CONT
VR1 ATW B PRESET
VR2 ATW R PRESET
IC1(a) ATW B PRESET
IC1(b) ATW R PRESET
IC3(c) R COMP
IC3(d) B COMP
IC4 ATW/AWC SELECT
CHROMA CLIP CONT
Q1~Q4 CHROMA CLIP CONT
VR5 CHROMA CLIP
SC PHASE CONT
Q6 SC PHASE CONT
VR6 YL CHROMA LEVEL
VR7 BURST LEVEL
VR8 TOTAL CHROMA PHASE
Q8~Q10 TOTAL CHROMA PHASE
COLOR BAR AMP
Q29~Q3 COLOR B AMP
Q40~Q42 COLOR BAR AMP
IC5 ENCODER
CHROMA AMP
Q11~Q13 CHROMA AMP
VR9 BURST REFERENCE PHASE
Y. AMP
Q50~Q52 Y.AMP
H. APERTURE
Q14~Q17 H. APERTURE
APERTURE PROCESS
IC6,Q18,Q20 APERTURE PROCESS
APERTURE/CHARACTER MIX
Q19,Q21,Q22,Q87,Q88 APERTURE/CHARACTER MIX
TP1 (ALC)
YH Fade/White
YH Delayed Aperture
Nega.Ped. Out Chroma
Aperture Main N/
Ext.N/P Chroma Ga
To Clamp
6dB Amp YL Pedesta
Vref YL OUT
Ext.Y Comp.Pulse
Ext.SC Letter
GROUND
Burst -Sync./P.B. Video Out
E
D
C
B
A
1
2
3

GRAM OF PROCESS BOARD


IC9
Q76~Q78
COMP VIDEO AMP
Q23,Q24
S-CONNECTOR CHROMA OUT
Q25~Q27
S-CONNECTOR Y OUT
Q39
COMP/Y.C SELECT
COLOR BAR AMP
Q29~Q31
COLOR BAR AMP
Y/CHROMA MIX
14 PIN CHROMA OUT
VR10
VIDEO LEVEL
Q79~Q83,Q90
Y/CHROMA MIX
Q35~Q38
14 PIN CHROMA OUT
IC7
IC7
CAMERA/BAR SELECT
32 PIN VIDEO OUT
Q43
C/B SELECT
Q44
COMP/VIDEO SELECT
Q45,48,49
32 PIN VIDEO OUT
Q50~Q52
Y.AMP
COLOR BAR AMP
Q53~Q55
COLOR BAR AMP
Q84,Q85
BUFFER
14 PIN VIDEO OUT
Q62~Q66
14 PIN VIDEO OUT
FLARE & PEDESTAL CONT
Q67
BLANKING INVERTER
IC8
Q68~Q71
FLARE & PEDESTAL CONT
S1 IN
S1 OUT
SIG IN
SIG OUT
COUT/4
S2 IN
S2 OUT
+9V IN
+9V OUT
Y OUT/4
CLP 0 IN
CLP 0 OUT
EXT VIDEO IN
C/B IN
COMP-Y/C SELECT IN
CLP 2 IN
CLP 2 OUT
C/B CONT IN
P.BLK IN
P.BLK OUT
COUT/14
VIDEO OUT/32
ID IN
ID OUT
BCH W/B IN
BCH W/B OUT
P/B 1 IN
BFP IN
BFP OUT
EVF VIDEO OUT
VIDEO OUT/14
RCH W/B IN
RCH W/B OUT
TEMP INF OUT
+1.8V IN
+5V OUT
+5V IN
FLARE IN
PED CONT IN
C.SBL IN
CN1 - ○ CN2 - □
CN3 - ◎ CN4 - ◇
4
5
6
7

CONDUCTOR VIEW OF PROCESS BOARD

PROCESS BOARD (COMPONENT SIDE VIEW)



PROCESS MAIN
VRBF015P2D
CN1
CN2
CN3
CN4
IC3
IC5
IC6
IC7
IC9
VR1
VR2
VR3
VR4
VR9
VR10
CF1
CF2
SW1
TP1
E
D
C
B
A
1
2
3

<Index>

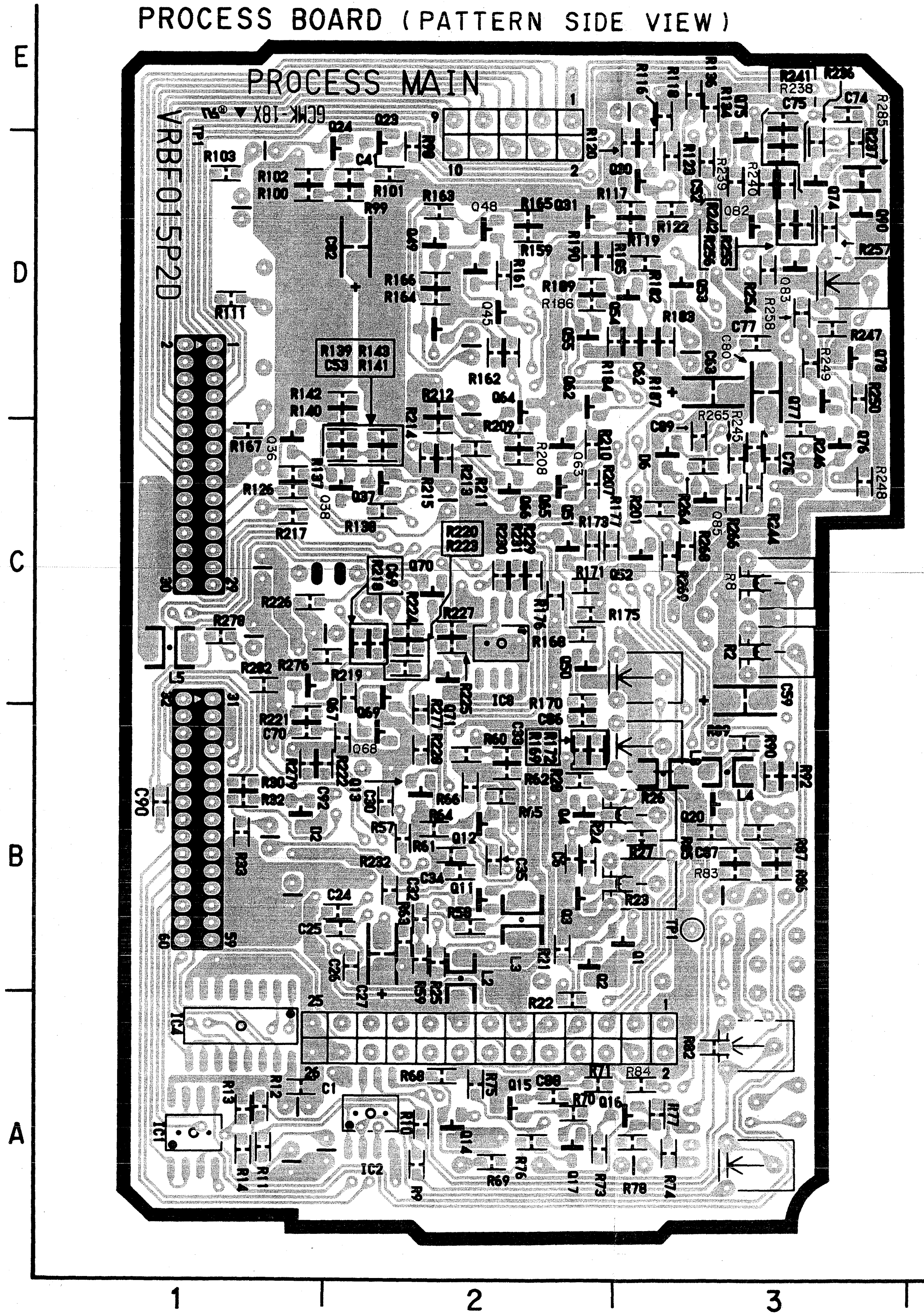
IC3	A3
IC5	B2, B3
IC6	A1
IC7	D2
IC9	C1, D1
Q5	B3
Q6	B2
Q7	B2
Q8	B2
Q9	B2
Q10	C2
Q18	A2
Q19	A2
Q21	B1
Q22	B1
Q25	D3
Q26	D3
Q27	D3
Q28	D2
Q29	D2
Q35	E2
Q39	C2
Q40	D2
Q41	D2
Q42	D2
Q43	D2
Q44	D2
Q72	E1
Q73	D1
Q79	D1
Q80	D1
Q81	D1
Q84	C1
Q87	C1
Q88	C1
Q89	E1
D3	B1
D4	B1

※

Ref. No	PAL	NTSC
R40	○	×
R91	×	○
C9	○	×

○ : USED
× : NOT USED

PROCESS BOARD (PATTERN SIDE VIEW)



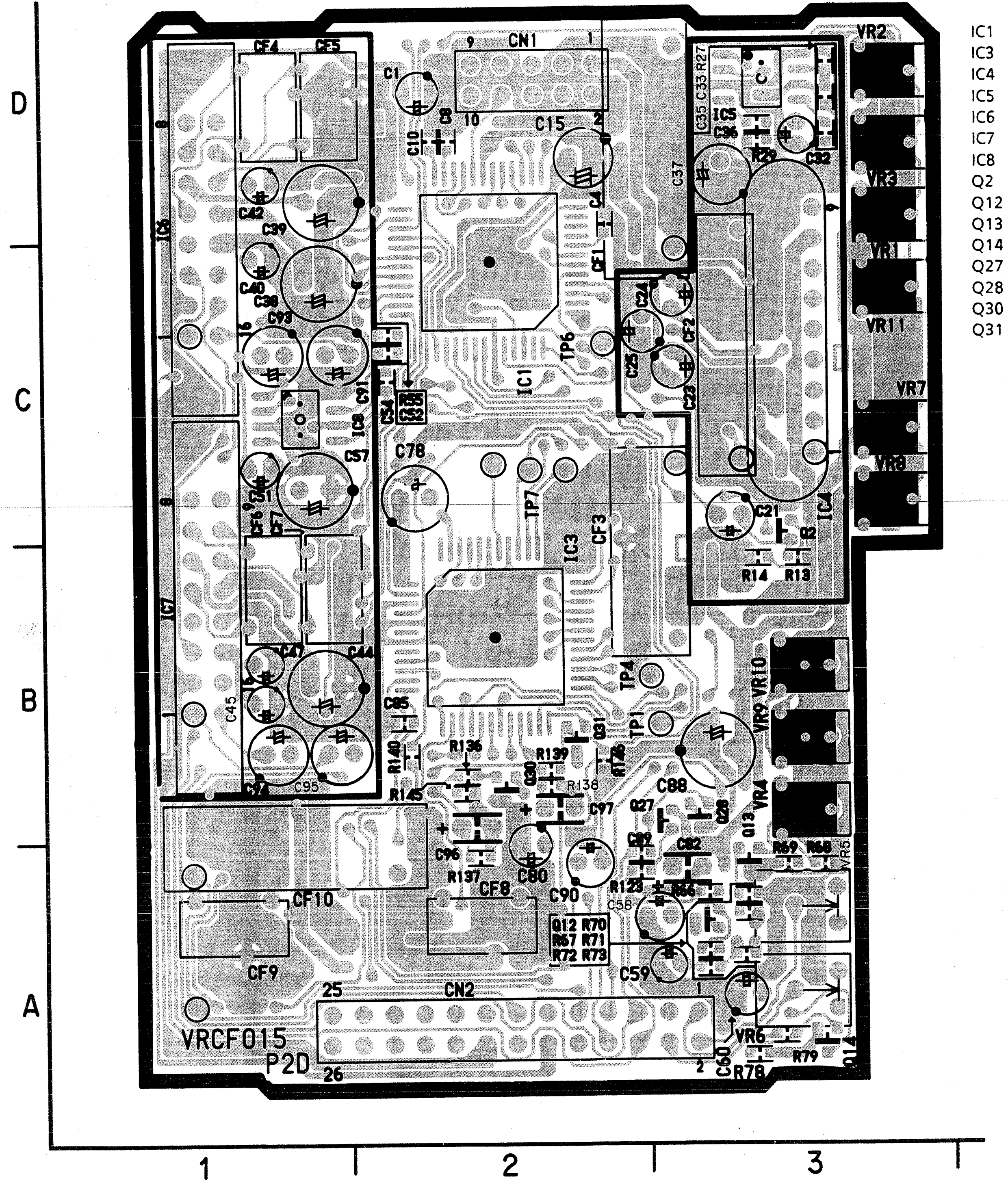
PROCESS MAIN
VRBF015P2D
6CMK-18X
IC1
IC2
IC4
IC8
CN3
CN4
TP1
E
D
C
B
A
1
2
3

<Index>

IC1	A1
IC2	A2
IC4	A1
IC8	C2
Q1	B3
Q2	B2
Q3	B2
Q4	B2
Q11	B2
Q12	B2
Q13	B2
Q14	A2
Q15	A2
Q16	A3
Q17	A2
Q20	B3
Q23	D2
Q24	D1
Q30	D2
Q31	D2
Q36	C1
Q37	C2
Q38	C2
Q45	D2
Q48	D2
Q49	D2
Q50	C2
Q51	C2
Q52	C3
Q53	D3
Q54	D3
Q55	D2
Q62	C2
Q63	C2
Q64	C2
Q65	C2
Q66	C2
Q67	C1
Q68	B2
Q69	C2
Q70	C2
Q71	C2
Q74	D3
Q75	D3
Q76	C3
Q77	D3
Q78	D3
Q82	D2
Q83	D3
Q85	C3
Q90	D3
D2	B1
D6	C3

CONDUCTOR VIEW OF PROCESS SUB BOARD

PROCESS SUB BOARD (COMPONENT SIDE VIEW)

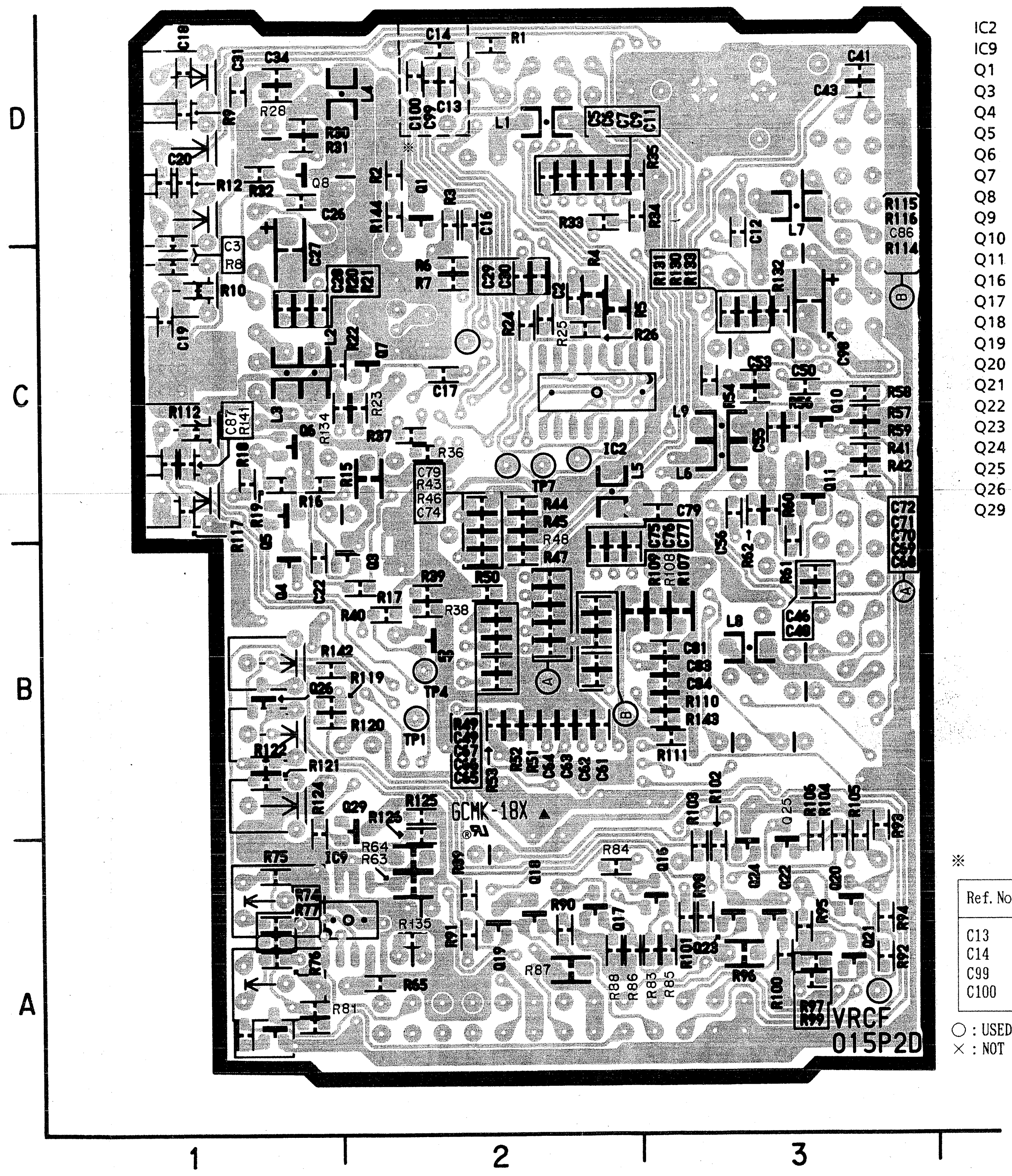


D
C
B
A
1
2
3
CN1
CN2
CF4
CF5
CF8
CF9
CF10
VR2
VR3
VR1
VR11
VR7
VR8
VR9
VR10
VR4
VR5
VR6
IC1
IC3
IC4
IC5
IC6
IC7
IC8
TP1
TP4
TP6
TP7
C15
C78
C88
C90
C59
R136
R139
R138
R145
R137
R14
R13
R78
R79
VRCF015
P2D

<Index>

IC1	C2
IC3	B2
IC4	C3
IC5	D3
IC6	C1, D1
IC7	B1, C1
IC8	C1
Q2	C3
Q12	A3
Q13	A3
Q14	A3
Q27	B3
Q28	B3
Q30	B2
Q31	B2

PROCESS SUB BOARD (PATTERN SIDE VIEW)



D
C
B
A
1
2
3
C14
C13
R1
C41
C43
L1
L7
L9
L6
L5
L8
IC2
IC9
TP1
TP4
TP7
R115
R116
C86
R114
R112
R36
R38
R84
R87
R135
R65
R81
R75
6CMK-18X
VRCF
015P2D

<Index>

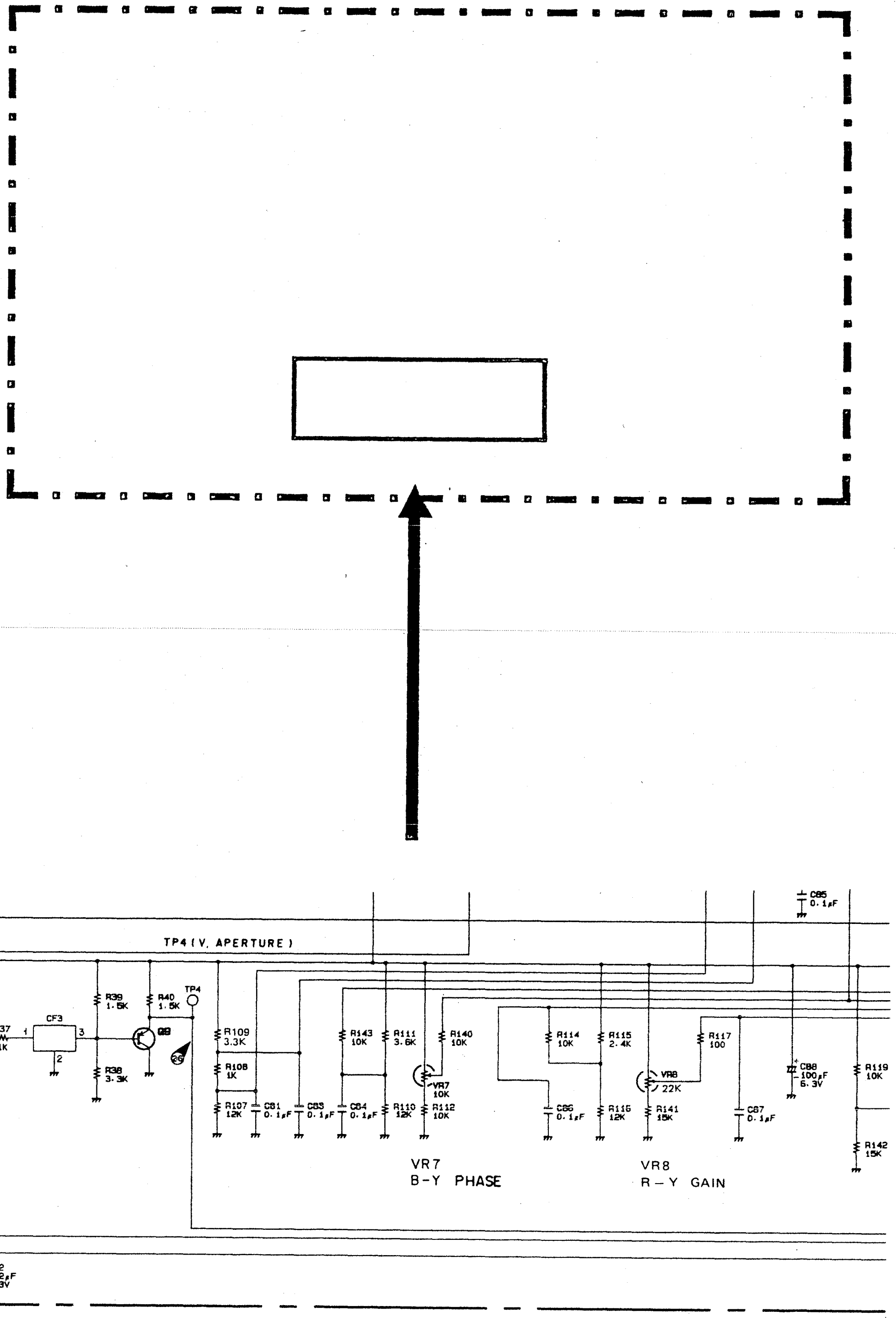
IC2	C2
IC9	A1, A2
Q1	D2
Q3	B1
Q4	B1
Q5	B1
Q6	C1
Q7	C2
Q8	D1
Q9	B2
Q10	C3
Q11	C3
Q16	A3
Q17	A2
Q18	A2
Q19	A2
Q20	A3
Q21	A3
Q22	A3
Q23	A3
Q24	A3
Q25	A3
Q26	B1
Q29	B2

※

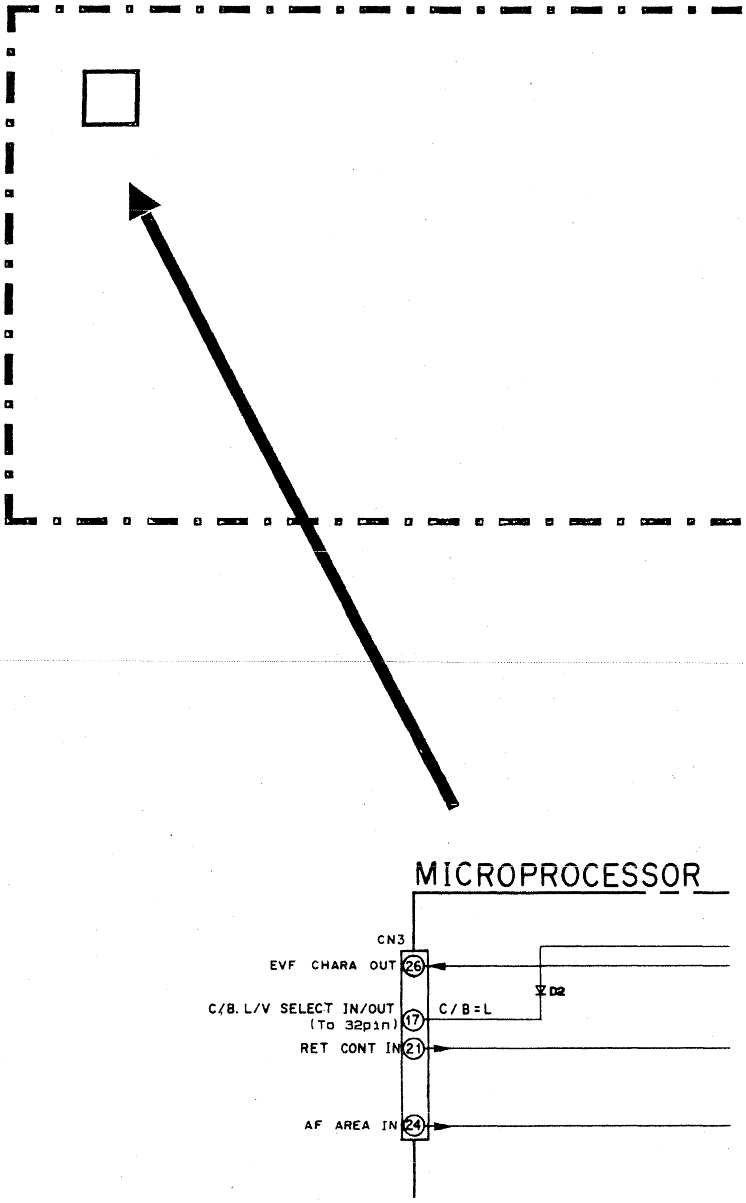
Ref. No	PAL	NTSC
C13	○	×
C14	○	×
C99	×	○
C100	×	○

○ : USED
× : NOT USED

SCHEMATIC DIAGRAM OF PROCESS SUB BOARD

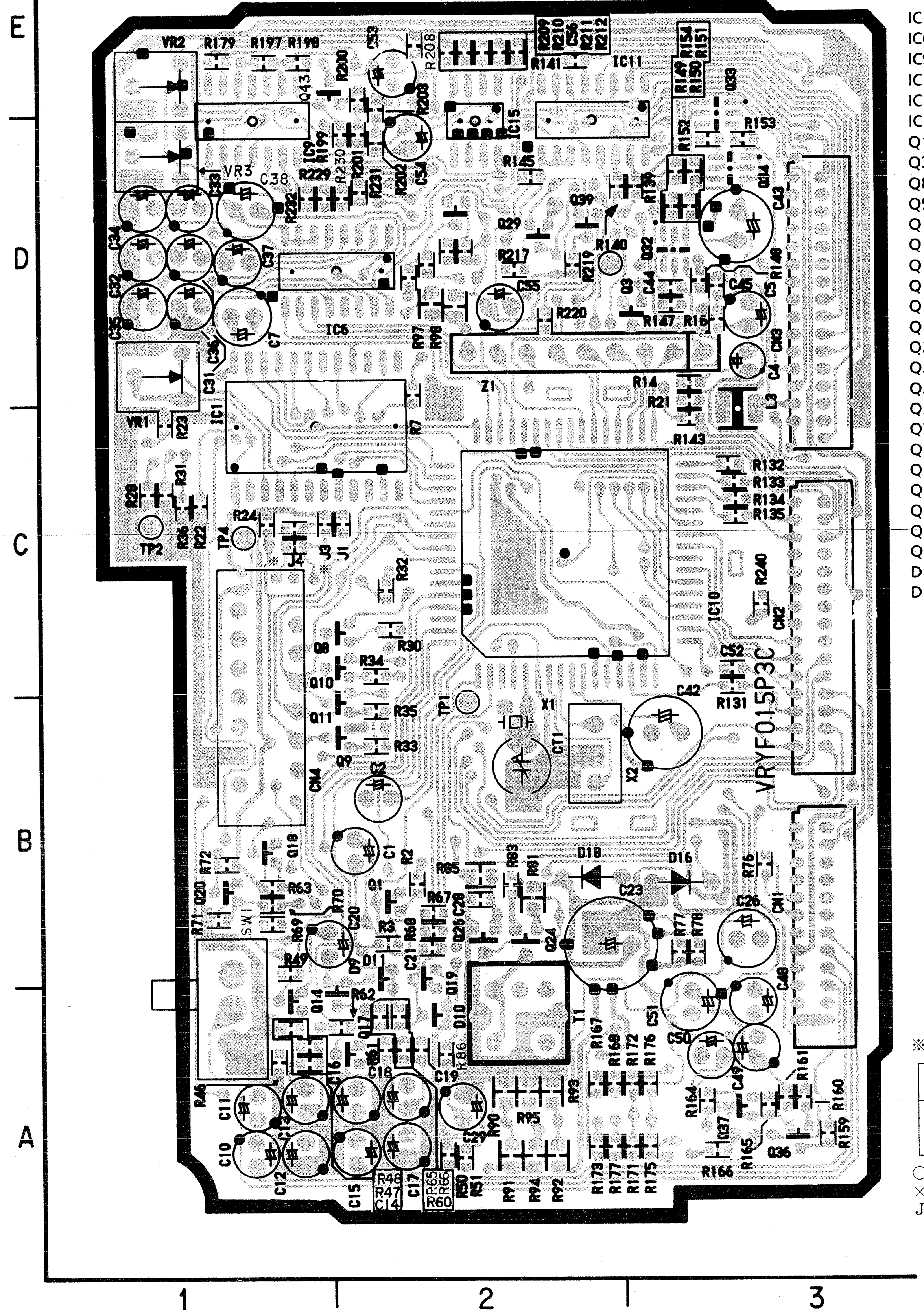

TP4 (V. APERTURE)
R37
1K
CF3
1
3
2
R39
1.5K
R38
3.3K
R40
1.5K
Q9
TP4
26
R109
3.3K
R108
1K
R107
12K
C81
0.1μF
C83
0.1μF
R143
10K
C84
0.1μF
R111
3.6K
R110
12K
R140
10K
VR7
10K
R112
10K
VR7
B-Y PHASE
R114
10K
C86
0.1μF
R115
2.4K
R116
12K
VR8
22K
R141
15K
R117
100
C87
0.1μF
C85
0.1μF
C88
100μF
6.3V
R119
10K
R142
15K
VR8
R-Y GAIN
C82
2.2μF
6.3V

SCHEMATIC DIAGRAM OF MICROPROCESSOR BOARD


MICROPROCESSOR
CN3
EVF CHARA OUT
26
C/B. L/V SELECT IN/OUT
(To 32pin)
17
C/B=L
D2
RET CONT IN
21
AF AREA IN
24

CONDUCTOR VIEW OF MICROPROCESSOR BOARD

MICROPROCESSOR BOARD (COMPONENT SIDE VIEW)


E
D
C
B
A
1
2
3
VRYF015P3C
IC1
IC6
IC10
IC11
IC15
VR1
VR2
VR3
SW1
TP1
TP2
TP4
X1
X2
Z1
T1
J3
J4
※

<Index>

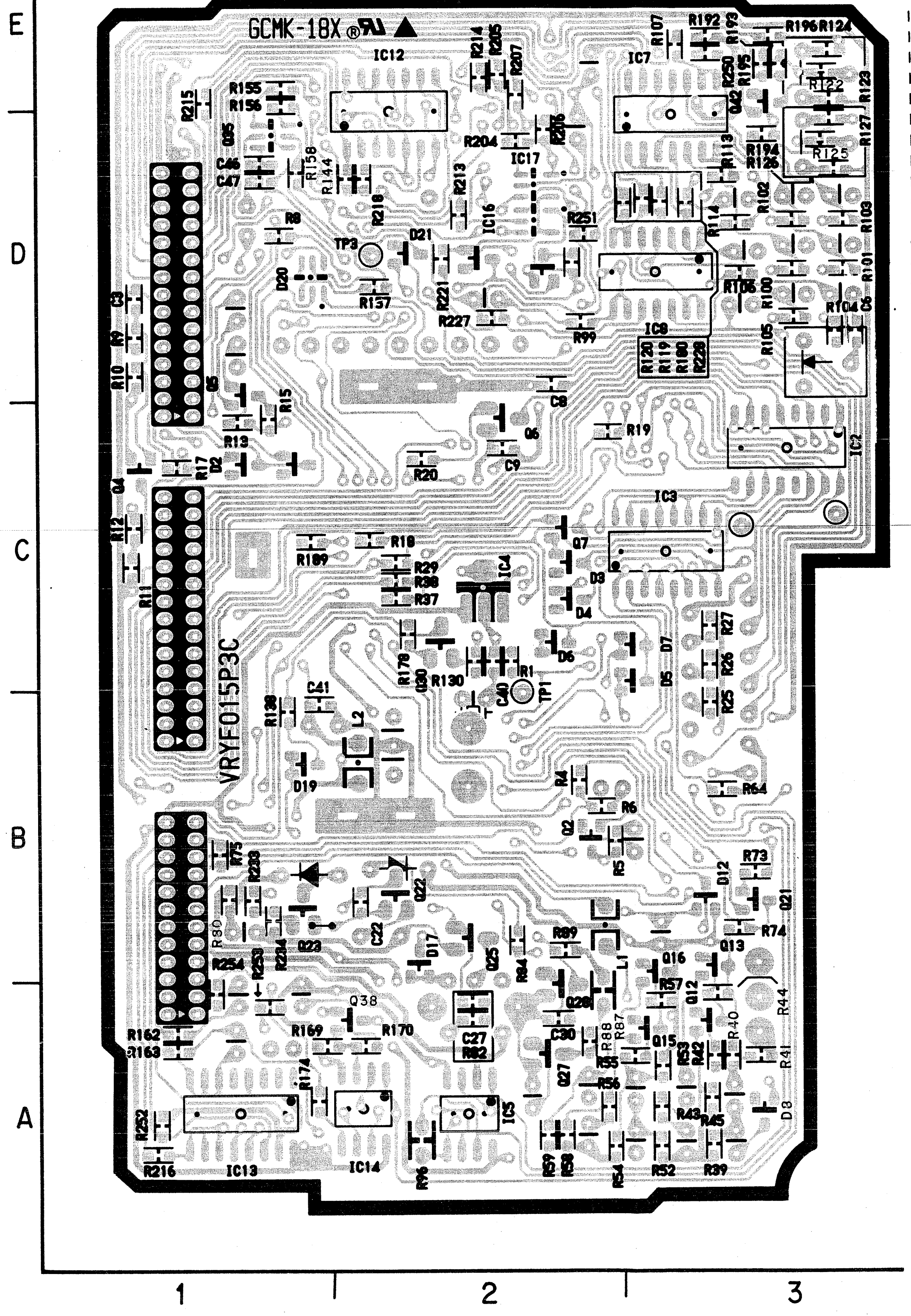
IC1	C1, C2
IC6	D2
IC9	D1
IC10	C2, C3
IC11	D2, D3
IC15	D2
Q1	B2
Q3	D2
Q8	C2
Q9	B2
Q10	C2
Q11	B2
Q14	A1
Q17	A2
Q18	B1
Q19	A2
Q20	B1
Q24	B2
Q26	B2
Q29	D2
Q32	D3
Q33	D3
Q34	D3
Q36	A3
Q37	A3
Q39	D2
Q43	E1
D16	B3
D18	B2

※

Ref. No	PAL	NTSC
J3	○	×
J4	×	○

○ : USED
× : NOT USED
J : JUMPER

MICROPROCESSOR BOARD (PATTERN SIDE VIEW)

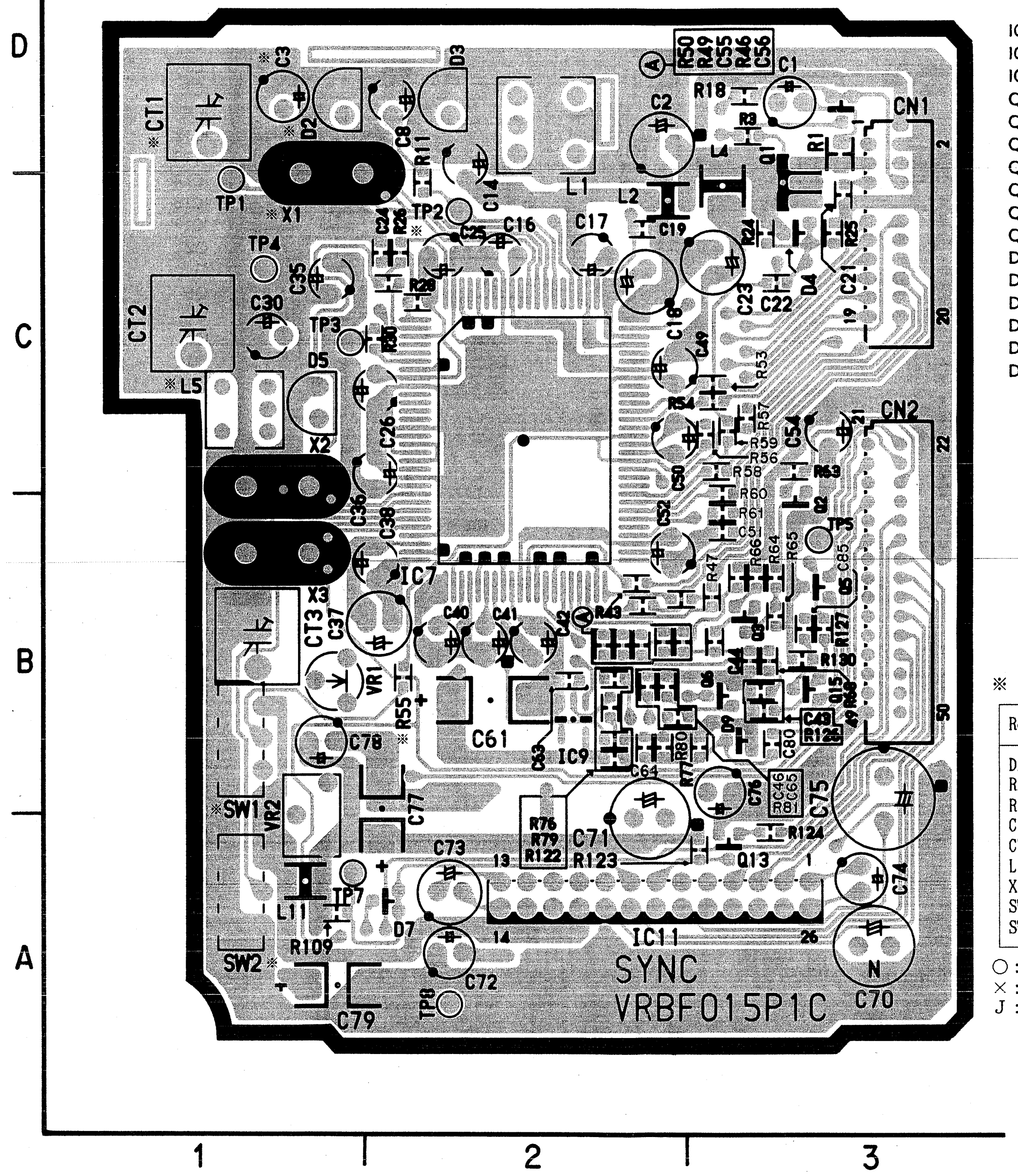

E
D
C
B
A
1
2
3
GCMK-18X
VRYF015P3C
IC2
IC3
IC4
IC5
IC7
IC8
IC12
IC13
IC14
IC16
IC17
TP1
TP3
L1
L2

<Index>

IC2	C3
IC3	C2, C3
IC4	C2
IC5	A2
IC7	D3
IC8	D2, D3
IC12	D1, D2
IC13	A1
IC14	A2
IC16	D2
IC17	D2
Q2	B2
Q4	C1
Q5	D1
Q6	C2
Q7	C2
Q12	A3
Q13	B3
Q15	A3
Q16	B3
Q21	B3
Q22	B2
Q23	B1
Q25	B2
Q27	A2
Q28	A2
Q30	C2
Q35	D1
Q38	A2
Q42	D3
D2	C1
D3	C2
D4	C2
D5	C3
D6	C2
D7	C2
D8	A3
D12	B3
D17	B2
D19	B1
D20	D1
D21	D2

CONDUCTOR VIEW OF SYNC BOARD

SYNC BOARD (COMPONENT SIDE VIEW)


D
C
B
A
1
2
3
CT1
CT2
CT3
TP1
TP2
TP3
TP4
TP5
TP7
TP8
X1
X2
X3
L1
L2
L5
L11
CN1
CN2
IC7
IC9
IC11
C61
C70
C71
C73
C75
VR1
VR2
SW1
SW2
R109
C79
SYNC
VRBF015P1C

<Index>

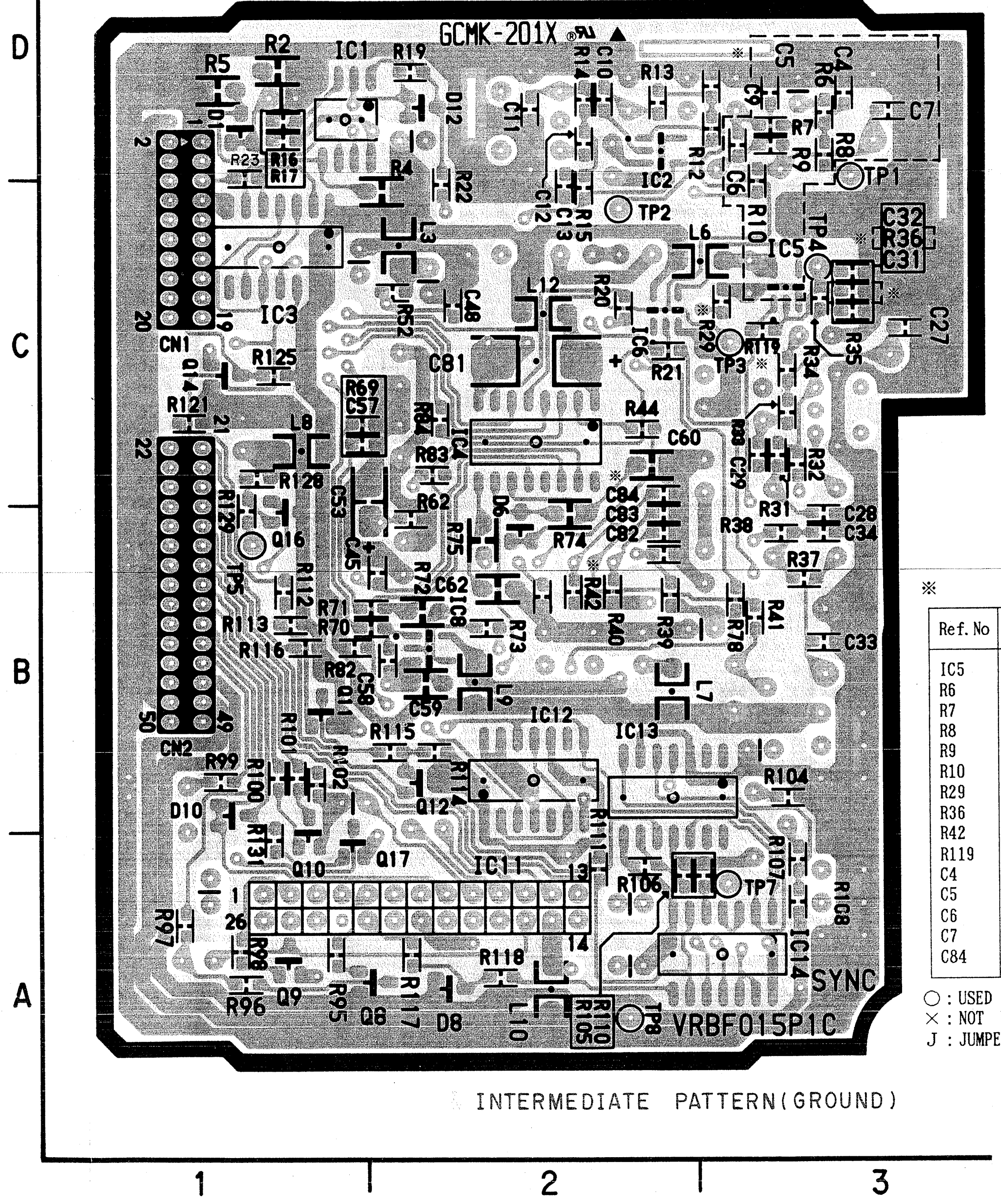
IC7	C2
IC9	B2
IC11	A2, A3
Q1	C3
Q2	B3
Q3	B3
Q5	B3
Q6	B3
Q13	A3
Q15	B3
D2	D1
D3	D2
D4	C3
D5	C1
D7	A2
D9	B3

※

Ref. No	PAL	NTSC
D2	○	×
R26	×	J
R55	×	J
C3	○	×
CT1	○	×
L5	○	J
X1	○	J
SW1	×	○
SW2	×	○

○ : USED
× : NOT USED
J : JUMPER

SYNC BOARD (PATTERN SIDE VIEW)


D
C
B
A
1
2
3
GCMK-201X
IC1
IC2
IC3
IC5
IC6
IC11
IC12
IC13
IC14
CN1
CN2
TP1
TP2
TP3
TP4
TP5
TP7
TP8
L6
L7
L8
L9
L10
L12
Q8
Q9
Q10
Q12
Q16
Q17
D8
D10
C81
SYNC
VRBF015P1C
INTERMEDIATE PATTERN(GROUND)

<Index>

IC1	D1
IC2	D2
IC3	C1
IC4	C2
IC5	C3
IC6	C2
IC8	B2
IC11	A1, A2
IC12	B2
IC13	B2
IC14	A3
Q8	A1
Q9	A1
Q10	A1
Q11	B1
Q12	B2
Q14	C1
Q16	B1
Q17	A1
D1	D1
D6	B2
D8	A2
D10	B1
D12	D2

※

Ref. No	PAL	NTSC
IC5	○	×
R6	○	×
R7	○	×
R8	○	×
R9	○	×
R10	○	×
R29	J	×
R36	×	○
R42	○	×
R119	×	J
C4	○	×
C5	○	×
C6	○	×
C7	○	×
C84	○	×

○ : USED
× : NOT USED
J : JUMPER

REF.NO.	PART NO.	DESCRIPTION	
R14	YF2116223JT	Carbon	22K ohms 1/16W
C1	ECST1CD336	Tantalum	33 µF 16V
C2	YF400104FZT	Ceramic	0.1 µF
C4	ECA1VFQ270	Electrolytic	27 µF 35V
C5	ECST1AD476ZR	Tantalum	47 µF 10V
C6	ECST1ED106ZR	Tantalum	10 µF 25V
C7	ECST1AD476ZR	Tantalum	47 µF 10V
C8	ECST1ED106ZR	Tantalum	10 µF 25V
C9	ECSF1AE106	Tantalum	10 µF 10V
C10	YF400103XKT	Ceramic	0.01 µF
	YF400104FZT	Ceramic	0.1 µF
L1	ELJFA8R2MF	Coil	8.2 µH
SW1	YFSSS222YK	Slide Switch	
CF2,3	YFBL1RN1A62	Filter	
CN1	YW520221010	Connector	
CN2-6	YW520223010	30-pin Connector	
CN7	YW520222410	24-pin Connector	
CN8	YW520222010	20-pin Connector	
CN9	YW520223010	30-pin Connector	
CN10	YW520221610	16-pin Connector	
CN11,12	ILWY30SD15T	30-pin Connector	
CN13	YF559708APB	8-pin Connector	
CN14	YF8272332116	32-pin Connector	
M81	YFV1KA0002A4	Washer	

SHUTTER BOARD

REF.NO.	PART NO.	DESCRIPTION
PCB12	YWVRAF015P4A	Printed Board
SW1	YWSS1015SPL	Slide Switch
CN1	YWY05S15L2EF	5-pin Connector

CONTROL BOARD

REF.NO.	PART NO.	DESCRIPTION	
PCB13 (NLA)	YWVKBF015E4A	Printed Circuit Board Assy	
Q1	2SD637-RS	Transistor	
D1	LN23SRP	Led	
D2	LN33SGP	Led	
R1	ERDS2TJ103	Carbon	10K ohms 1/4W
R2	ERDS2TJ511	Carbon	510 ohms 1/4W
R3	ERDS2TJ333	Carbon	33K ohms 1/4W
R4	ERDS2TJ332	Carbon	3.3K ohms 1/4W
R5	ERDS2TJ433	Carbon	43K ohms 1/4W
R7	ERDS2TJ511	Carbon	510 ohms 1/4W
VR1	YWVRV0038A	Variable Resistor	
SW1	EVQQS404B	Push Switch	
SW2	YWSSSS212AN	Slide Switch	
SW3	EVQQS404B	Push Switch	
SW4	YWSSSS223	Slide Switch	
SW5	YWSSSS212AN	Slide Switch	

REF.NO.	PART NO.	DESCRIPTION
SW6	EVQQEJ04K	Push Switch
SW7	YWSSSS212AN	Slide Switch
CN1	YWY06PS15L2E	6-pin Connector
CN2	YWY07PS15L2E	7-pin Connector
J6	ERDS2TC0	Jumper Resistor
M110	YVZC601FR05	LED Holder

ATW CONNECTOR BOARD

REF.NO.	PART NO.	DESCRIPTION
PCB14	YWF15FJ6A	Flexible Board
	YF69346104	4-pin Connector

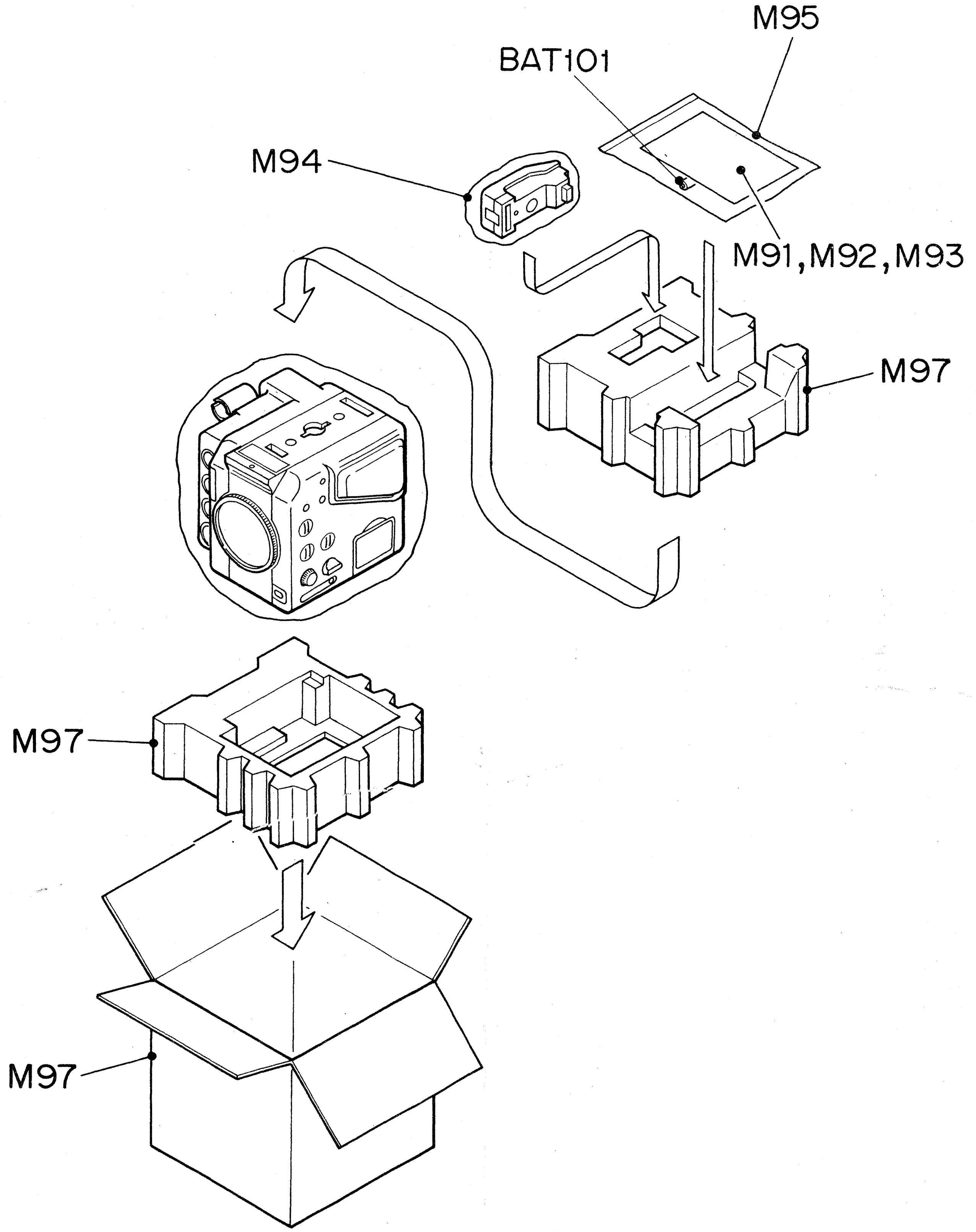
ATW BOARD

REF.NO.	PART NO.	DESCRIPTION	
PCB15	YWV0EA0138AN	Flexible Board	
IC1	NJM2904M	IC	
R1-4	YWTH2KJ202J	Thermistor	2K ohms
R5-8	YF2116333JT	Carbon	33K ohms
R9-11	YF2116103JT	Carbon	10K ohms
VR1	EVMVR10K	Variable Resistor	10K ohms
C1	ECEA0JKS220	Electrolytic	22 µF 6.3V

ACCESSORY PARTS/PACKAGING PARTS

REF.NO.	PART NO.	DESCRIPTION
BAT101	LR03EPAB	Battery
M91	YWV8QA2036AN	Operating Instructions
M92	MET77026106	Service Guide
M93	YWV8RA0247AN	System Instructions
M94	YWT10X16C03	Polyethylene Bag
M95	YWT26X40C03	Polyethylene Bag
M97	YWV9CA1406AN	Packaging Assy

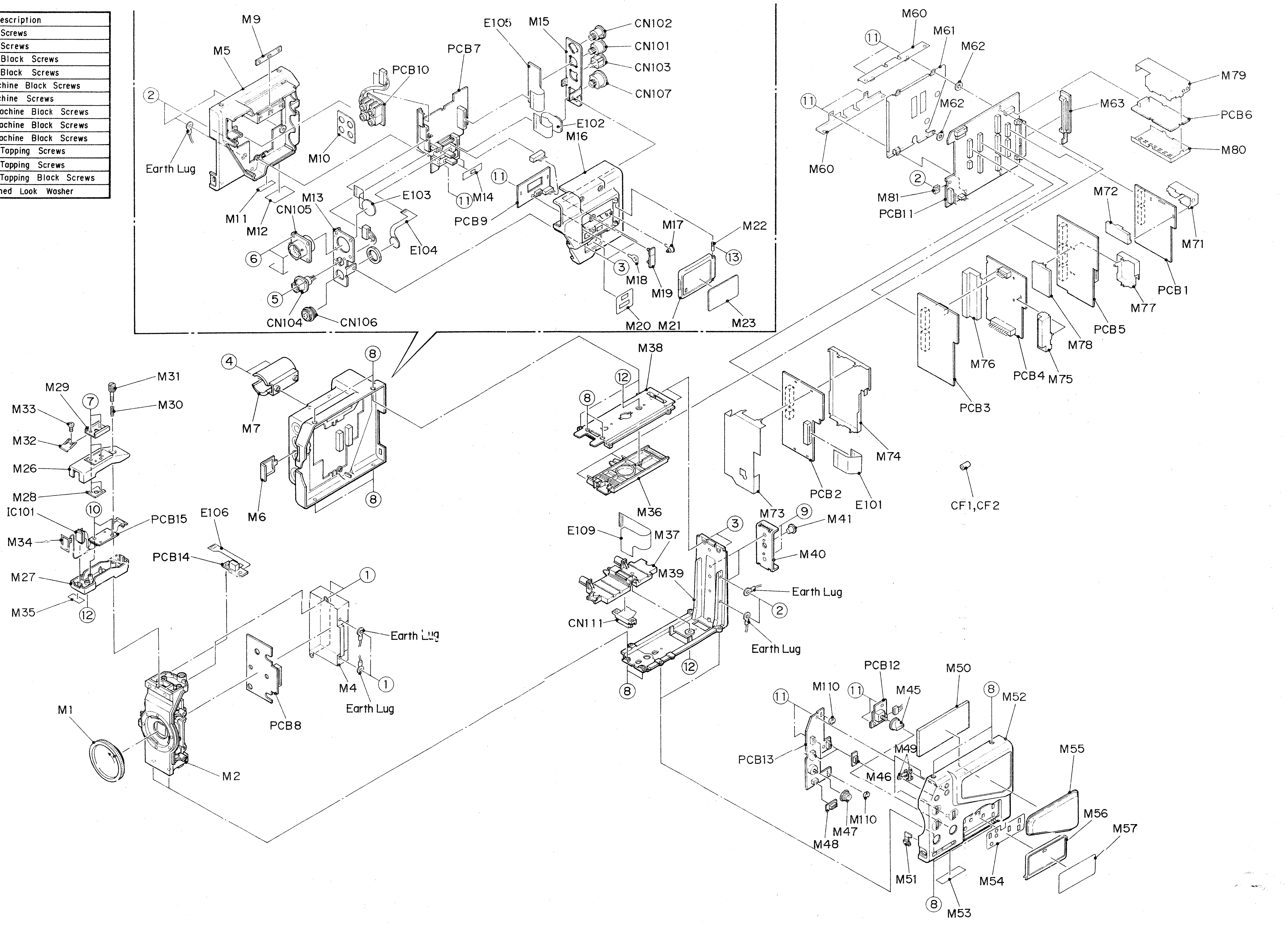
PACKAGING



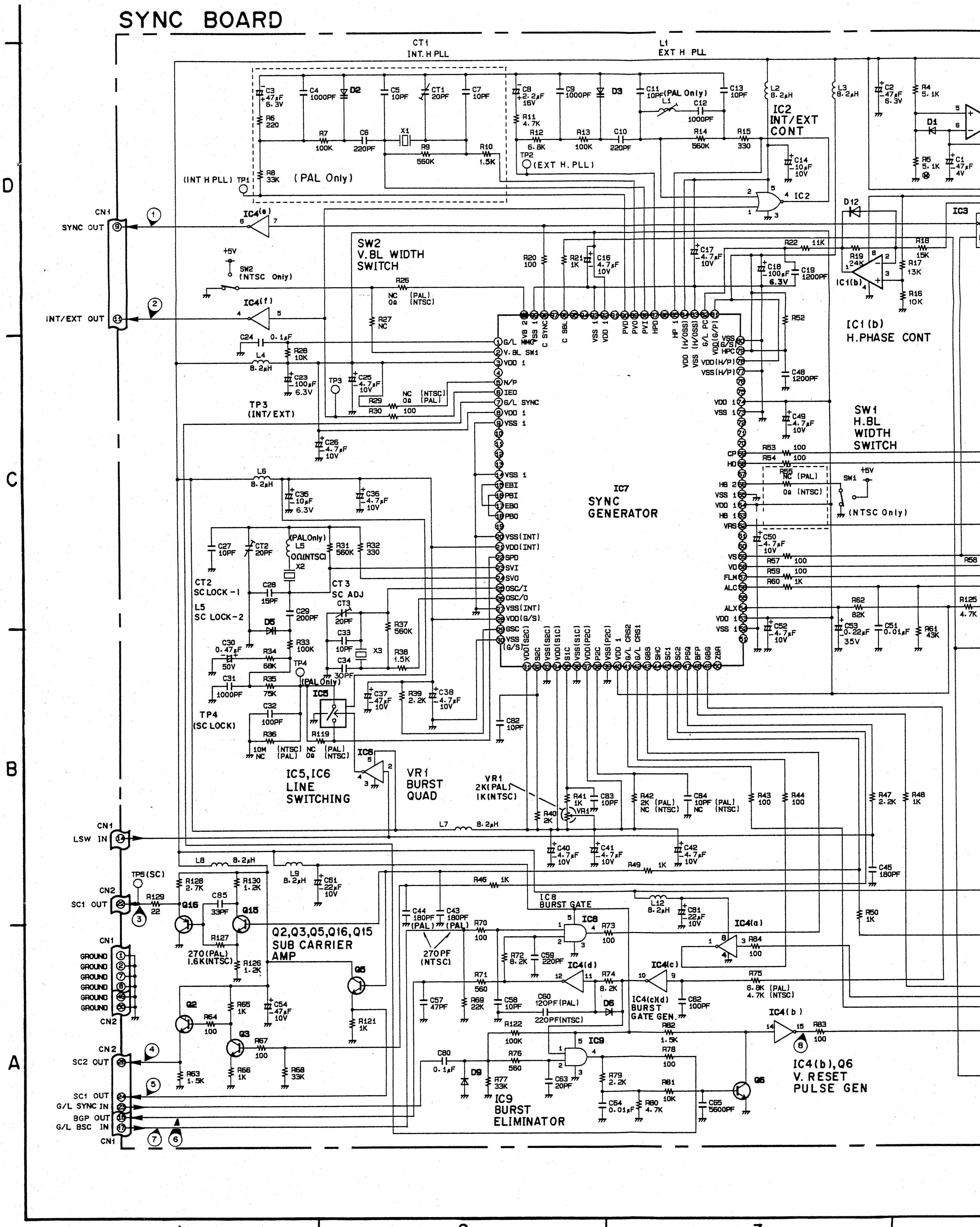
EXPLODED VIEW

○ Numbers show Screws.

No.	Screws	Description
①	XSB26+4FX	Binding Head Screws
②	XSB26+6FX	Binding Head Screws
③	XSB26+6FXK	Binging Head Black Screws
④	XSB26+10FXK	Binging Head Black Screws
⑤	XSN26+6FXK	Pan Head Machine Black Screws
⑥	XSN3+6FN	Pan Head Machine Screws
⑦	XSS2 +6FXK	Flush Head Machine Black Screws
⑧	XSS26+6FXK	Flush Head Machine Black Screws
⑨	XSS3 +6FXK	Flush Head Machine Black Screws
⑩	XTB2 +6CFX	Binding Head Tapping Screws
⑪	XTB26+6CFX	Binding Head Tapping Screws
⑫	XTB26+8CFXK	Binding Head Tapping Black Screws
⑬	XUC15FXK	External Toothed Look Washer

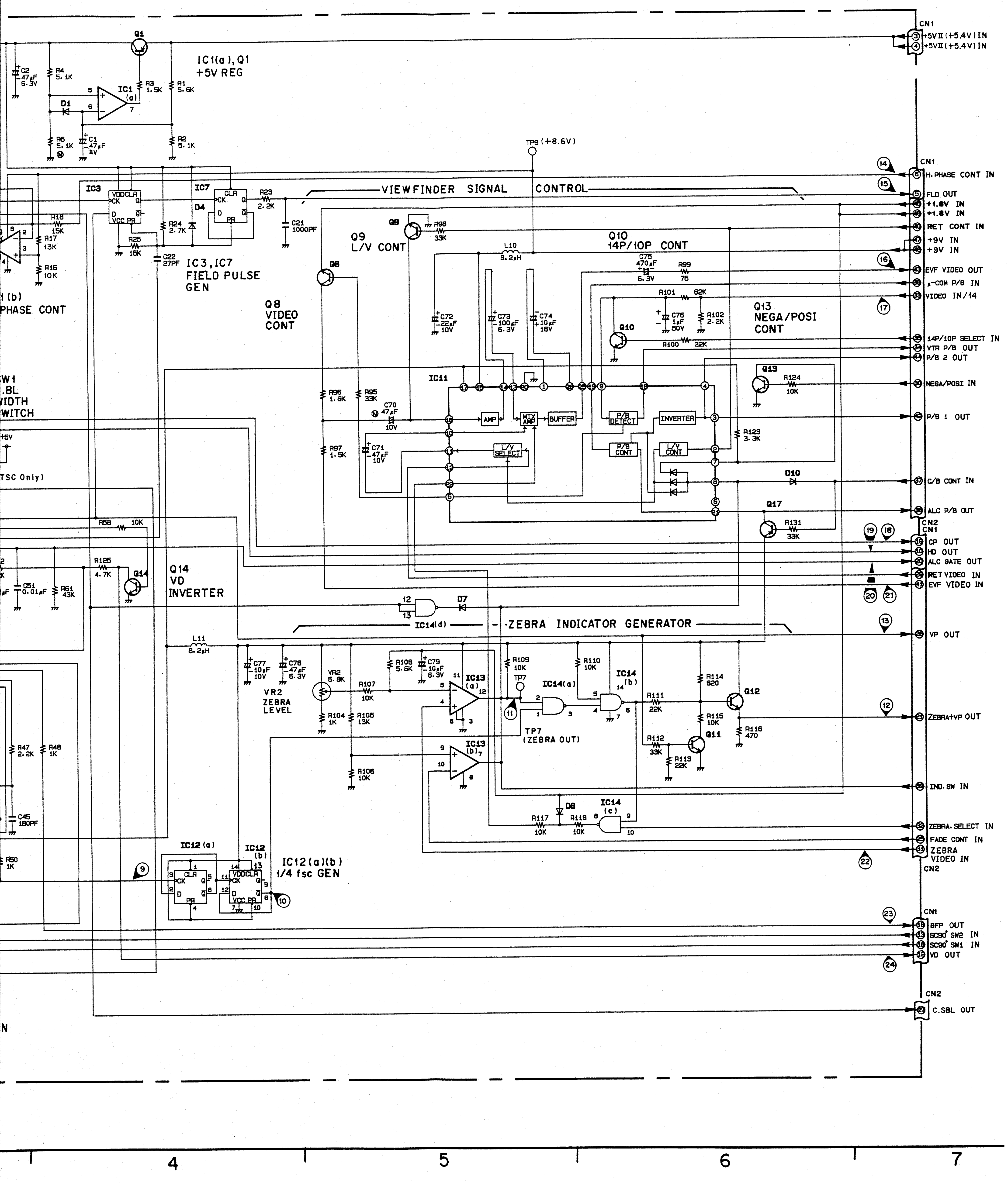

M9
M5
②
Earth Lug
PCB10
M10
M11
M12
M13
CN105
E103
E104
⑥
⑤
CN104
CN106
PCB7
E105
M15
CN102
CN101
CN103
CN107
E102
M16
⑪
M14
PCB9
M17
M22
⑬
③
M18
M19
M20
M21
M23
M60
⑪
M61
M62
M62
M79
M63
PCB6
M80
M60
②
M81
PCB11
M72
M71
PCB1
M77
PCB5
M78
M76
PCB4
M75
PCB3
M74
PCB2
E101
M73
CF1,CF2
④
⑧
M7
M6
⑧
M38
⑫
⑧
M36
E109
M37
M39
CN111
⑫
⑧
③
⑨
M41
M40
Earth Lug
②
Earth Lug
M31
M29
⑦
M30
M33
M32
M26
M28
⑩
IC101
PCB15
M34
M27
M35
⑫
E106
PCB14
①
Earth Lug
①
M4
Earth Lug
PCB8
M1
M2
PCB12
M50
⑧
M52
M110
⑪
M45
⑪
PCB13
M49
M46
M110
M47
M48
M55
M56
M57
M51
M54
⑧
M53

SCHEMATIC DIAGRAM C

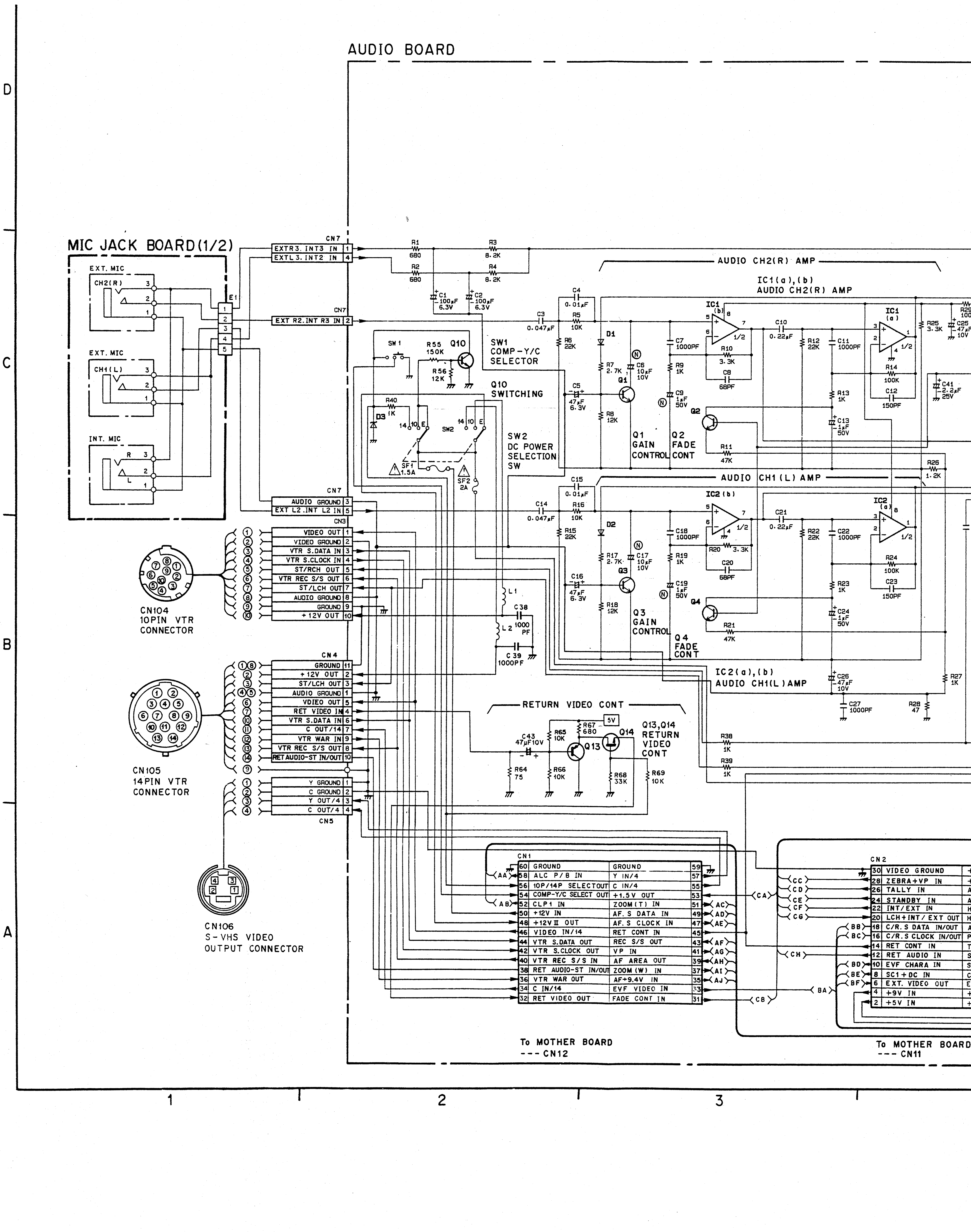

SYNC BOARD
CT1 INT. H PLL
L1 EXT H PLL
(INT H PLL) TP1
(PAL Only)
TP2 (EXT H. PLL)
IC2 INT/EXT CONT
IC3
IC1(b) H.PHASE CONT
CN1
SYNC OUT
INT/EXT OUT
IC4(e)
IC4(f)
+5V
SW2 (NTSC Only)
SW2 V.BL WIDTH SWITCH
TP3 (INT/EXT)
IC7 SYNC GENERATOR
SW1 H.BL WIDTH SWITCH
SW1 (NTSC Only)
CT2 SC LOCK-1
L5 SC LOCK-2
CT3 SC ADJ
TP4 (SC LOCK)
IC5,IC6 LINE SWITCHING
VR1 BURST QUAD
VR1 2K(PAL) 1K(NTSC)
LSW IN
TP5(SC)
SC1 OUT
CN2
GROUND
Q2,Q3,Q5,Q16,Q15 SUB CARRIER AMP
IC8 BURST GATE
IC4(a)
IC4(c)
IC4(d)
IC4(c)(d) BURST GATE GEN.
IC4(b)
IC4(b),Q6 V. RESET PULSE GEN
SC2 OUT
SC1 OUT
G/L SYNC IN
BGP OUT
G/L BSC IN
IC9 BURST ELIMINATOR
D
C
B
A
1
2
3

IAGRAM OF SYNC BOARD

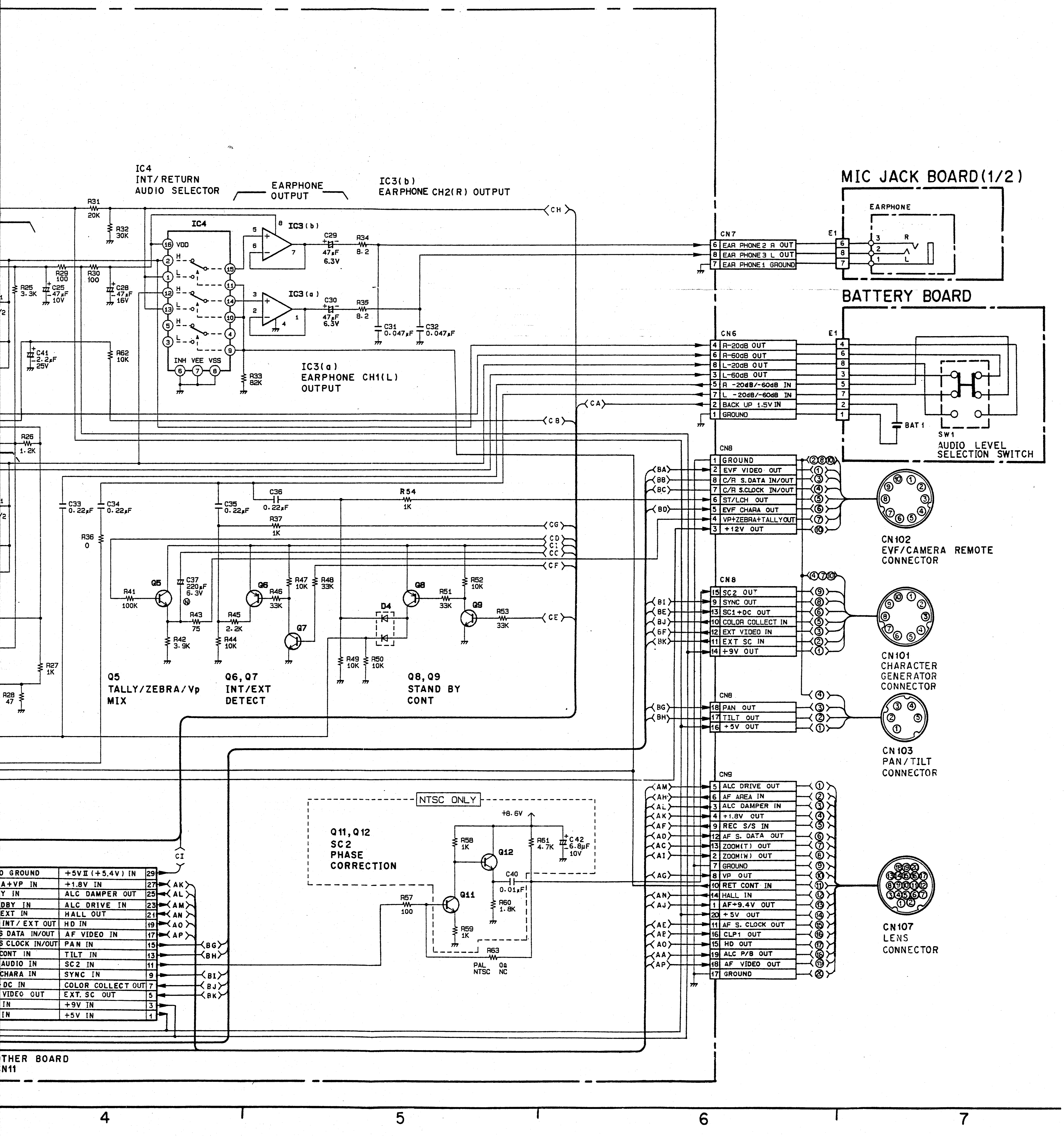
Suppl 2


IC1(a),Q1
+5V REG
Q1
IC1 (a)
D1
C2 47µF 6.3V
R4 5.1K
R3 1.5K
R1 5.6K
R5 5.1K
C1 47µF 4V
R2 5.1K
TP8 (+8.6V)
IC3
IC7
D4
R18 15K
R17 13K
R16 10K
R23 2.2K
R24 2.7K
R25 15K
C21 1000PF
C22 27PF
IC3,IC7
FIELD PULSE
GEN
(b)
PHASE CONT
VIEWFINDER SIGNAL CONTROL
Q9
L/V CONT
R98 33K
Q8
Q8
VIDEO
CONT
L10 8.2µH
Q10
14P/10P CONT
C75 470µF 6.3V
R99 75
R101 62K
R102 2.2K
C76 1µF 50V
R100 22K
C72 22µF 10V
C73 100µF 6.3V
C74 10µF 16V
Q13
NEGA/POSI
CONT
Q13
R124 10K
IC11
R96 1.8K
R95 33K
C70 47µF 10V
R97 1.5K
C71 47µF 10V
AMP
MIX AMP
BUFFER
P/B DETECT
INVERTER
L/V SELECT
P/B CONT
L/V CONT
R123 3.3K
D10
Q17
R131 33K
W1
.BL
IDTH
WITCH
+5V
TSC Only)
R58 10K
R125 4.7K
Q14
Q14
VD
INVERTER
C51 0.01µF
R61 43K
IC14(d)
D7
ZEBRA INDICATOR GENERATOR
L11 8.2µH
C77 10µF 10V
C78 47µF 6.3V
VR2 5.8K
VR2
ZEBRA
LEVEL
R108 5.6K
C79 10µF 6.3V
R107 10K
R104 1K
R105 13K
R106 10K
IC13 (a)
IC13 (b)
R109 10K
TP7
TP7
(ZEBRA OUT)
IC14(a)
R110 10K
IC14 (b)
R114 620
Q12
R111 22K
R115 10K
R116 470
Q11
R112 33K
R113 22K
D8
IC14 (c)
R117 10K
R118 10K
R47 2.2K
R48 1K
C45 180PF
R50 1K
IC12(a)
IC12 (b)
IC12(a)(b)
1/4 fsc GEN
CN1
+5VII(+5.4V)IN
+5VII(+5.4V)IN
CN1
H.PHASE CONT IN
FLD OUT
+1.8V IN
+1.8V IN
RET CONT IN
+9V IN
+9V IN
EVF VIDEO OUT
µ-COM P/B IN
VIDEO IN/14
14P/10P SELECT IN
VTR P/B OUT
P/B 2 OUT
NEGA/POSI IN
P/B 1 OUT
C/B CONT IN
ALC P/B OUT
CN2
CN1
CP OUT
HD OUT
ALC GATE OUT
RET VIDEO IN
EVF VIDEO IN
VP OUT
ZEBRA+VP OUT
IND.SW IN
ZEBRA.SELECT IN
FADE CONT IN
ZEBRA VIDEO IN
CN2
CN1
BFP OUT
SC90° SW2 IN
SC90° SW1 IN
VD OUT
CN2
C.SBL OUT
N
4
5
6
7

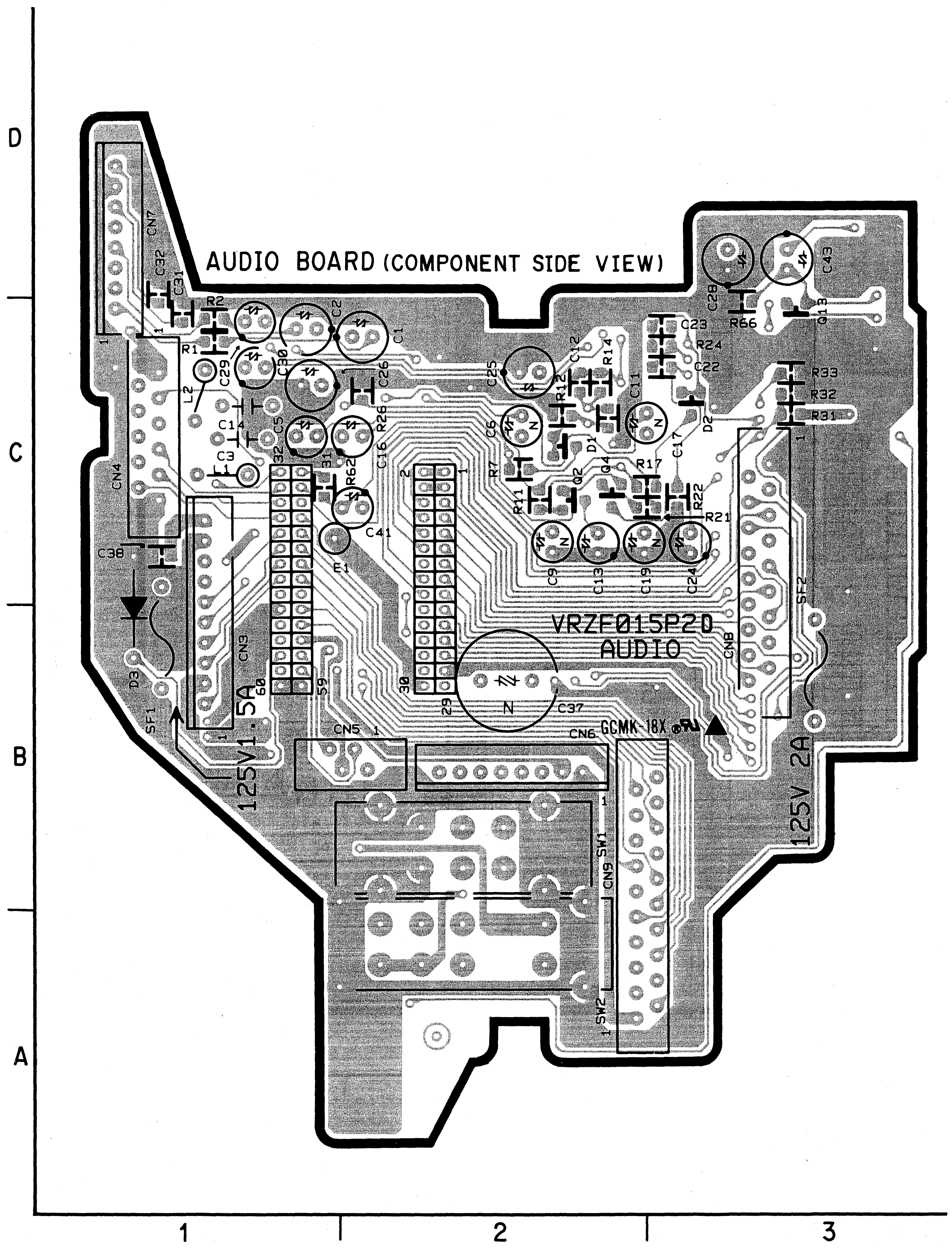
SCHEMATIC DIAGRA


D
C
B
A
1
2
3
AUDIO BOARD
MIC JACK BOARD(1/2)
EXT. MIC
CH2(R)
EXT. MIC
CH1(L)
INT. MIC
E1
CN7
EXTR3. INT3 IN
EXTL3. INT2 IN
EXT R2. INT R3 IN
AUDIO GROUND
EXT L2. INT L2 IN
CN3
VIDEO OUT
VIDEO GROUND
VTR S.DATA IN
VTR S.CLOCK IN
ST/RCH OUT
VTR REC S/S OUT
ST/LCH OUT
AUDIO GROUND
GROUND
+12V OUT
CN104
10PIN VTR
CONNECTOR
CN4
GROUND
+12V OUT
ST/LCH OUT
AUDIO GROUND
VDIEO OUT
RET VIDEO IN
VTR S.DATA IN
C OUT/14
VTR WAR IN
VTR REC S/S OUT
RET AUDIO-ST IN/OUT
CN105
14PIN VTR
CONNECTOR
CN5
Y GROUND
C GROUND
Y OUT/4
C OUT/4
CN106
S-VHS VIDEO
OUTPUT CONNECTOR
SW1
COMP-Y/C
SELECTOR
Q10
SWITCHING
SW2
DC POWER
SELECTION
SW
SF1
1.5A
SF2
2A
AUDIO CH2(R) AMP
IC1(a),(b)
AUDIO CH2(R) AMP
AUDIO CH1(L) AMP
IC2(a),(b)
AUDIO CH1(L) AMP
Q1
GAIN
CONTROL
Q2
FADE
CONT
Q3
GAIN
CONTROL
Q4
FADE
CONT
RETURN VIDEO CONT
Q13,Q14
RETURN
VIDEO
CONT
CN1
60 GROUND
58 ALC P/B IN
56 10P/14P SELECTOUT
54 COMP-Y/C SELECT OUT
52 CLP1 IN
50 +12V IN
48 +12V II OUT
46 VIDEO IN/14
44 VTR S.DATA OUT
42 VTR S.CLOCK OUT
40 VTR REC S/S IN
38 RET AUDIO-ST IN/OUT
36 VTR WAR OUT
34 C IN/14
32 RET VIDEO OUT
59 GROUND
57 Y IN/4
55 C IN/4
53 +1.5V OUT
51 ZOOM(T) IN
49 AF. S DATA IN
47 AF. S CLOCK IN
45 RET CONT IN
43 REC S/S OUT
41 VP IN
39 AF AREA OUT
37 ZOOM (W) IN
35 AF+9.4V IN
33 EVF VIDEO IN
31 FADE CONT IN
To MOTHER BOARD
--- CN12
CN2
30 VIDEO GROUND
28 ZEBRA+VP IN
26 TALLY IN
24 STANDBY IN
22 INT/EXT IN
20 LCH+INT/EXT OUT
18 C/R.S DATA IN/OUT
16 C/R.S CLOCK IN/OUT
14 RET CONT IN
12 RET AUDIO IN
10 EVF CHARA IN
8 SC1+DC IN
6 EXT. VIDEO OUT
4 +9V IN
2 +5V IN
To MOTHER BOARD
--- CN11

AGRAM OF AUDIO BOARD

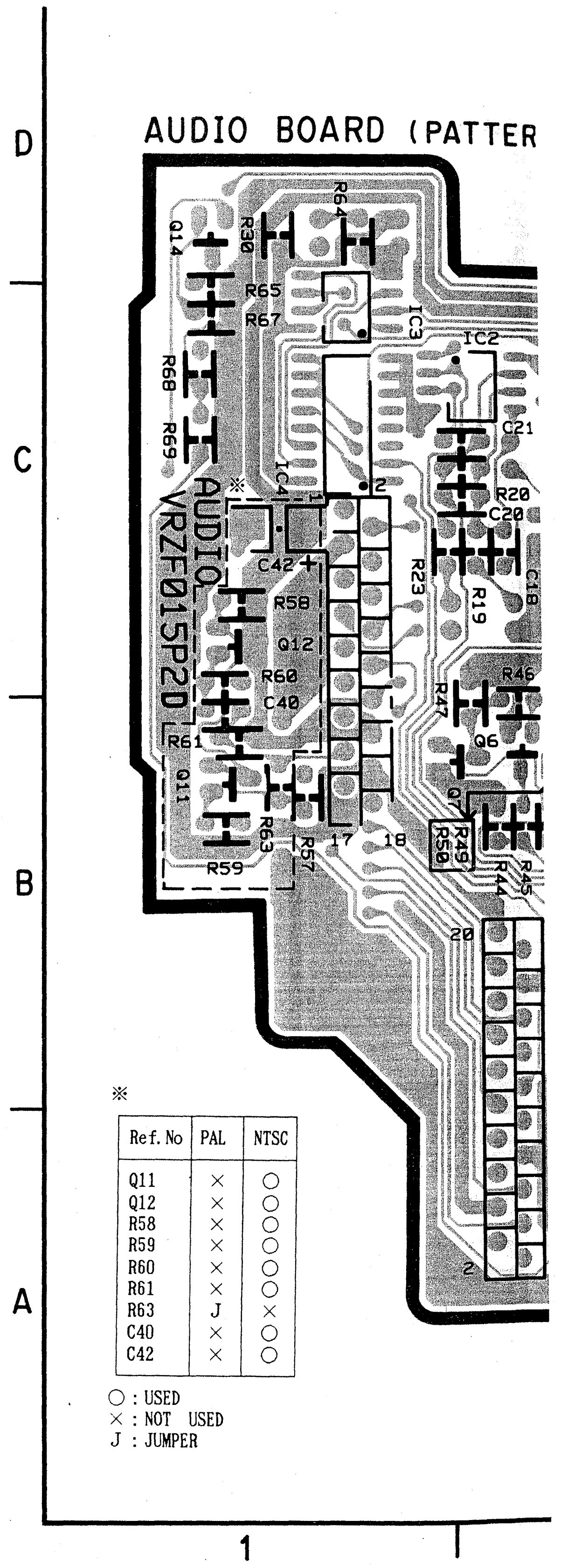

IC4
INT/RETURN
AUDIO SELECTOR
EARPHONE OUTPUT
IC3(b)
EARPHONE CH2(R) OUTPUT
IC3(a)
EARPHONE CH1(L)
OUTPUT
IC4
VDD
INH VEE VSS
IC3(b)
IC3(a)
R31 20K
R32 30K
R29 100
R30 100
R25 3.3K
C25 47μF 10V
C28 47μF 16V
C41 2.2μF 25V
R62 10K
R33 82K
C29 47μF 6.3V
R34 8.2
C30 47μF 6.3V
R35 8.2
C31 0.047μF
C32 0.047μF
R26 1.2K
R27 1K
R28 47
C33 0.22μF
C34 0.22μF
R36 0
C35 0.22μF
C36 0.22μF
R37 1K
R54 1K
C37 220μF 6.3V
R41 100K
R42 3.9K
R43 75
R44 10K
R45 2.2K
R46 33K
R47 10K
R48 33K
R49 10K
R50 10K
R51 33K
R52 10K
R53 33K
Q5
Q6
Q7
Q8
Q9
D4
Q5
TALLY/ZEBRA/Vp
MIX
Q6, Q7
INT/EXT
DETECT
Q8, Q9
STAND BY
CONT
CH
CB
CA
CG
CD
CI
CC
CF
CE
CI
NTSC ONLY
+8.6V
Q11, Q12
SC2
PHASE
CORRECTION
R58 1K
R61 4.7K
C42 6.8μF 10V
Q12
C40 0.01μF
R57 100
Q11
R60 1.8K
R59 1K
R63
PAL 0Ω
NTSC NC
MIC JACK BOARD(1/2)
EARPHONE
CN7
E1
6 EAR PHONE 2 R OUT
8 EAR PHONE 3 L OUT
7 EAR PHONE 1 GROUND
R
L
BATTERY BOARD
CN6
4 R-20dB OUT
6 R-60dB OUT
8 L-20dB OUT
3 L-60dB OUT
5 R -20dB/-60dB IN
7 L -20dB/-60dB IN
2 BACK UP 1.5V IN
1 GROUND
BAT 1
SW 1
AUDIO LEVEL
SELECTION SWITCH
CN8
1 GROUND
2 EVF VIDEO OUT
8 C/R S.DATA IN/OUT
7 C/R S.CLOCK IN/OUT
6 ST/LCH OUT
5 EVF CHARA OUT
4 VP+ZEBRA+TALLY OUT
3 +12V OUT
BA
BB
BC
BD
CN102
EVF/CAMERA REMOTE
CONNECTOR
CN8
15 SC2 OUT
9 SYNC OUT
13 SC1+DC OUT
10 COLOR COLLECT IN
12 EXT VIDEO IN
11 EXT SC IN
14 +9V OUT
BI
BE
BJ
BF
BK
CN101
CHARACTER
GENERATOR
CONNECTOR
CN8
18 PAN OUT
17 TILT OUT
16 +5V OUT
BG
BH
CN103
PAN/TILT
CONNECTOR
CN9
5 ALC DRIVE OUT
6 AF AREA IN
3 ALC DAMPER IN
4 +1.8V OUT
9 REC S/S IN
12 AF S. DATA OUT
13 ZOOM(T) OUT
2 ZOOM(W) OUT
7 GROUND
8 VP OUT
10 RET CONT IN
14 HALL IN
1 AF+9.4V OUT
20 +5V OUT
11 AF S. CLOCK OUT
16 CLP1 OUT
15 HD OUT
19 ALC P/B OUT
18 AF VIDEO OUT
17 GROUND
AM
AH
AL
AK
AF
AD
AC
AI
AG
AN
AJ
AE
AO
AA
AP
CN107
LENS
CONNECTOR
D GROUND
A+VP IN
Y IN
DBY IN
EXT IN
INT/EXT OUT
S DATA IN/OUT
S CLOCK IN/OUT
CONT IN
AUDIO IN
CHARA IN
DC IN
VIDEO OUT
IN
IN
+5V II (+5.4V) IN 29
+1.8V IN 27
ALC DAMPER OUT 25
ALC DRIVE IN 23
HALL OUT 21
HD IN 19
AF VIDEO IN 17
PAN IN 15
TILT IN 13
SC2 IN 11
SYNC IN 9
COLOR COLLECT OUT 7
EXT. SC OUT 5
+9V IN 3
+5V IN 1
THER BOARD
N11
4
5
6
7

CONDUCTOR VIEW OF AUDIO BOARD


AUDIO BOARD (COMPONENT SIDE VIEW)
VRZF015P2D
AUDIO
125V1.5A
125V 2A
GCMK-18X
CN3
CN4
CN5
CN6
CN7
CN8
CN9
SW1
SW2
SF1
SF2
E1
C37
C41
D
C
B
A
1
2
3

<Index>

Q2	C2
Q4	C2
Q13	C3
D1	C2
D2	C3
D3	B1

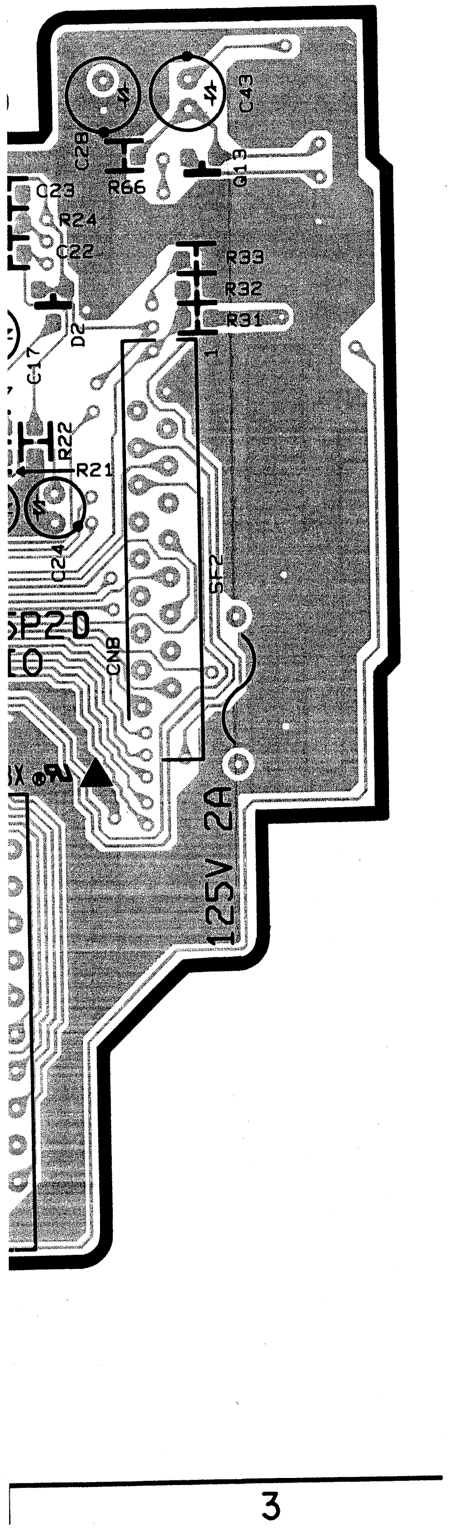

AUDIO BOARD (PATTER
AUDIO
VRZF015P2D
IC2
IC3
IC4
D
C
B
A
1

※

Ref. No	PAL	NTSC
Q11	×	○
Q12	×	○
R58	×	○
R59	×	○
R60	×	○
R61	×	○
R63	J	×
C40	×	○
C42	×	○

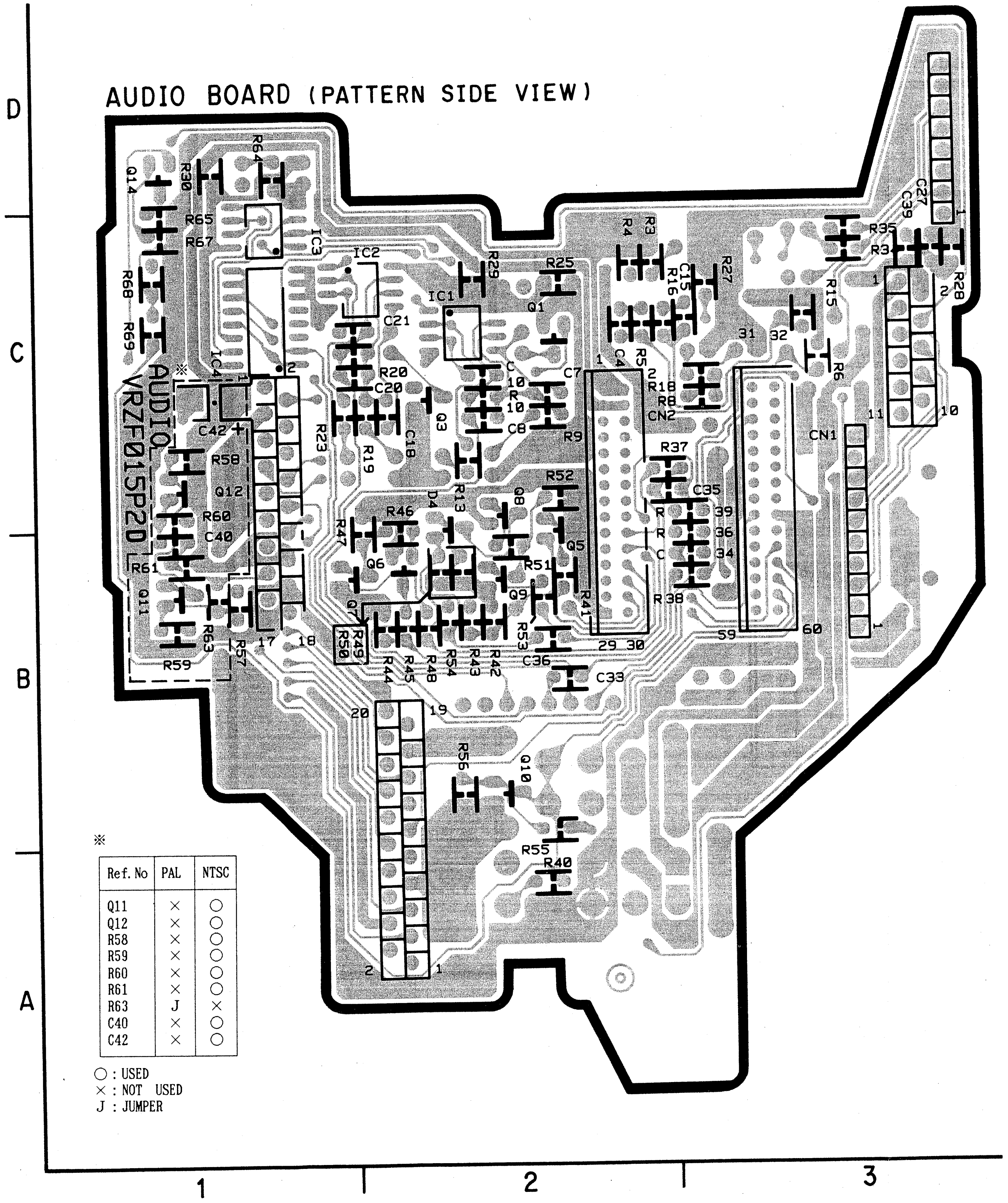
○ : USED
× : NOT USED
J : JUMPER

CONDUCTOR VIEW OF AUDIO BOARD


C28
C43
Q13
R66
C23
R24
C22
R33
R32
R31
D2
C17
R22
R21
C24
SF2
CNB
SP20
125V 2A
3

<Index>

Q2	C2
Q4	C2
Q13	C3
D1	C2
D2	C3
D3	B1


AUDIO BOARD (PATTERN SIDE VIEW)
D
C
B
A
1
2
3
AUDIO VRZF015P20
IC1
IC2
IC3
IC4
CN1
CN2
Q1
Q3
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
Q14
D4
R64
R30
R65
R67
R68
R69
R58
R60
R61
R63
R59
R57
R23
C42
C40
C21
R20
C20
R19
C18
R29
R25
R13
R46
R47
R49
R50
R44
R45
R48
R54
R43
R42
R53
R51
R41
C36
C33
R52
R3
R4
R16
C15
R27
R5
C4
R18
R8
C7
R9
C8
R37
C35
R38
R15
R6
R35
C39
C27
R28
R55
R40
R56
R39
R36
R34
31
32
29
30
17
18
19
20
59
60
11
10

※

Ref. No	PAL	NTSC
Q11	×	○
Q12	×	○
R58	×	○
R59	×	○
R60	×	○
R61	×	○
R63	J	×
C40	×	○
C42	×	○

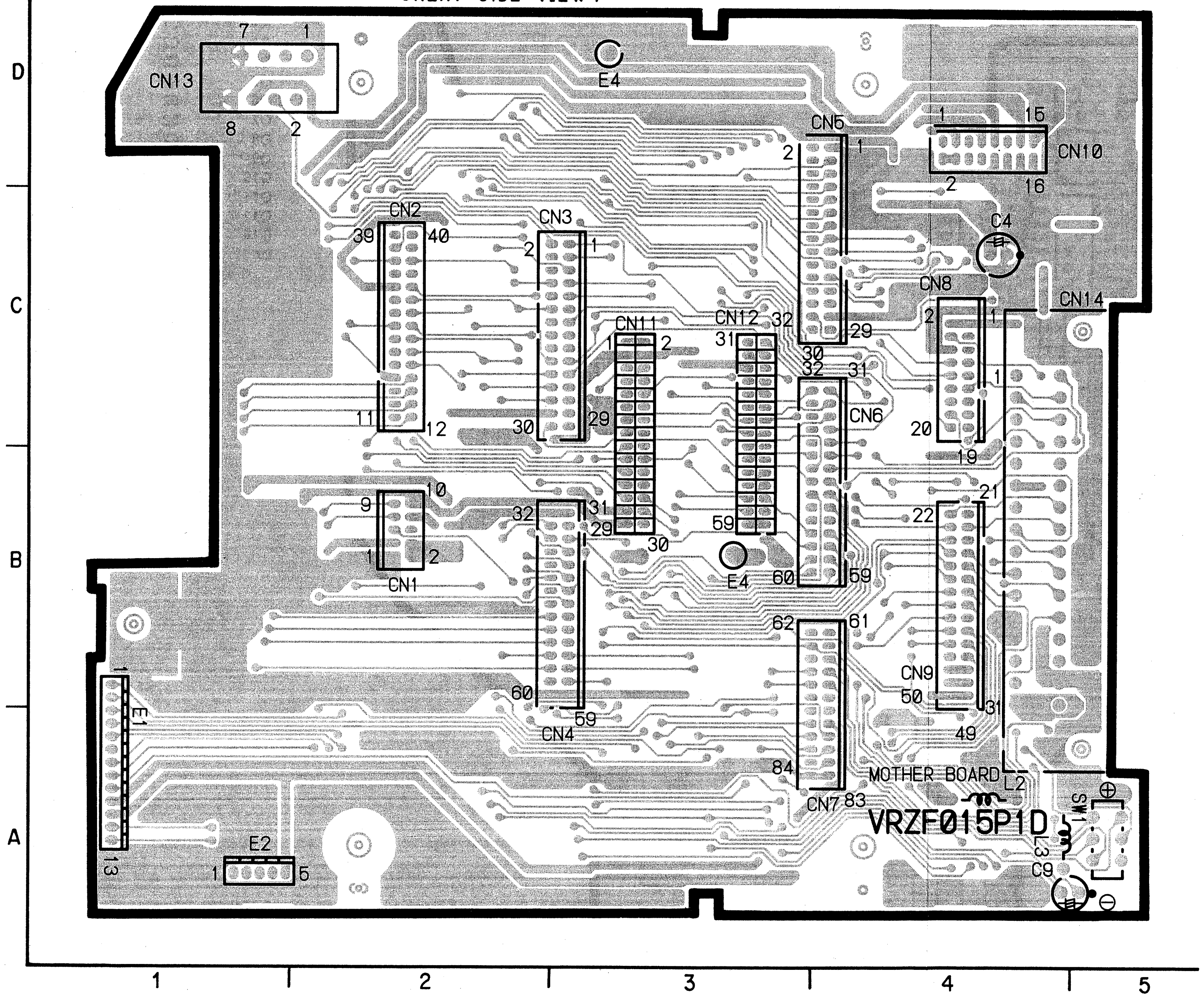
○ : USED
× : NOT USED
J : JUMPER

<Index>

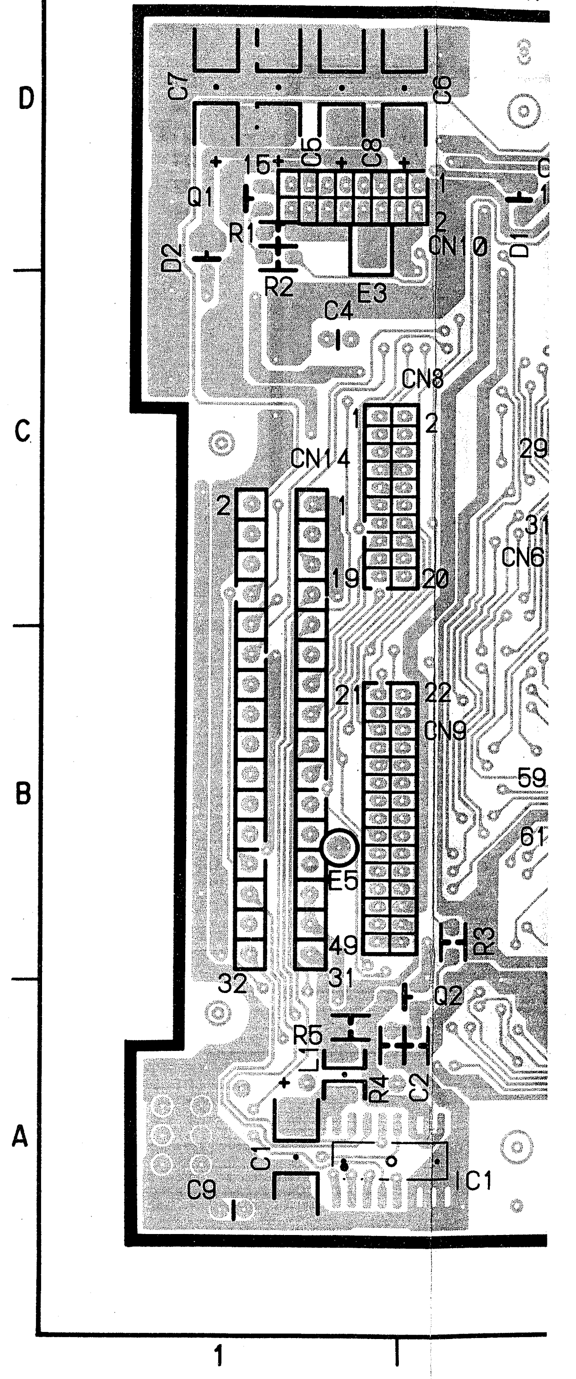
IC1	C2
IC2	C2
IC3	C1
IC4	C1
Q1	C2
Q3	C2
Q5	B2
Q6	B2
Q7	B2
Q8	C2
Q9	B2
Q10	B2
Q11	B1
Q12	C1
Q14	D1
D4	C2

CONDUCTOR VIEW OF MOTHER BOARD

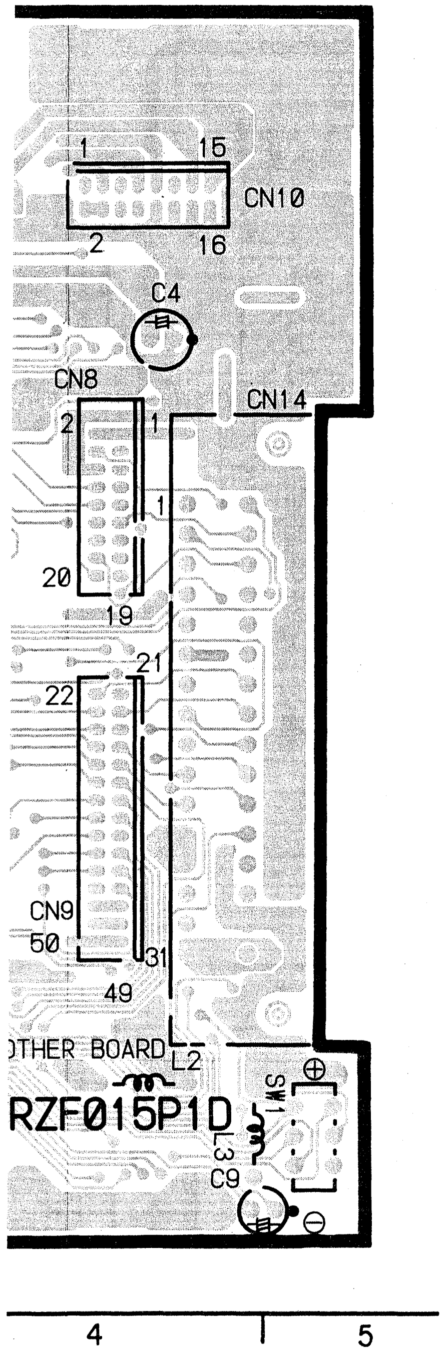
MOTHER BOARD (COMPONENT SIDE VIEW)


D
C
B
A
1
2
3
4
5
CN13
7
1
8
2
E4
CN5
2
1
CN10
1
15
2
16
C4
CN2
39
40
11
12
CN3
2
1
30
29
CN11
1
2
29
30
CN12
31
32
59
CN8
2
1
20
19
CN14
30
32
31
CN6
60
59
E4
CN1
9
10
1
2
CN4
32
31
60
59
22
21
CN9
50
49
31
62
61
84
CN7 83
E1
1
13
E2
1
5
MOTHER BOARD
VRZF015P1D
L2
L3
SW1
C9
⊕
⊖

MOTHER BOARD (PATTERN

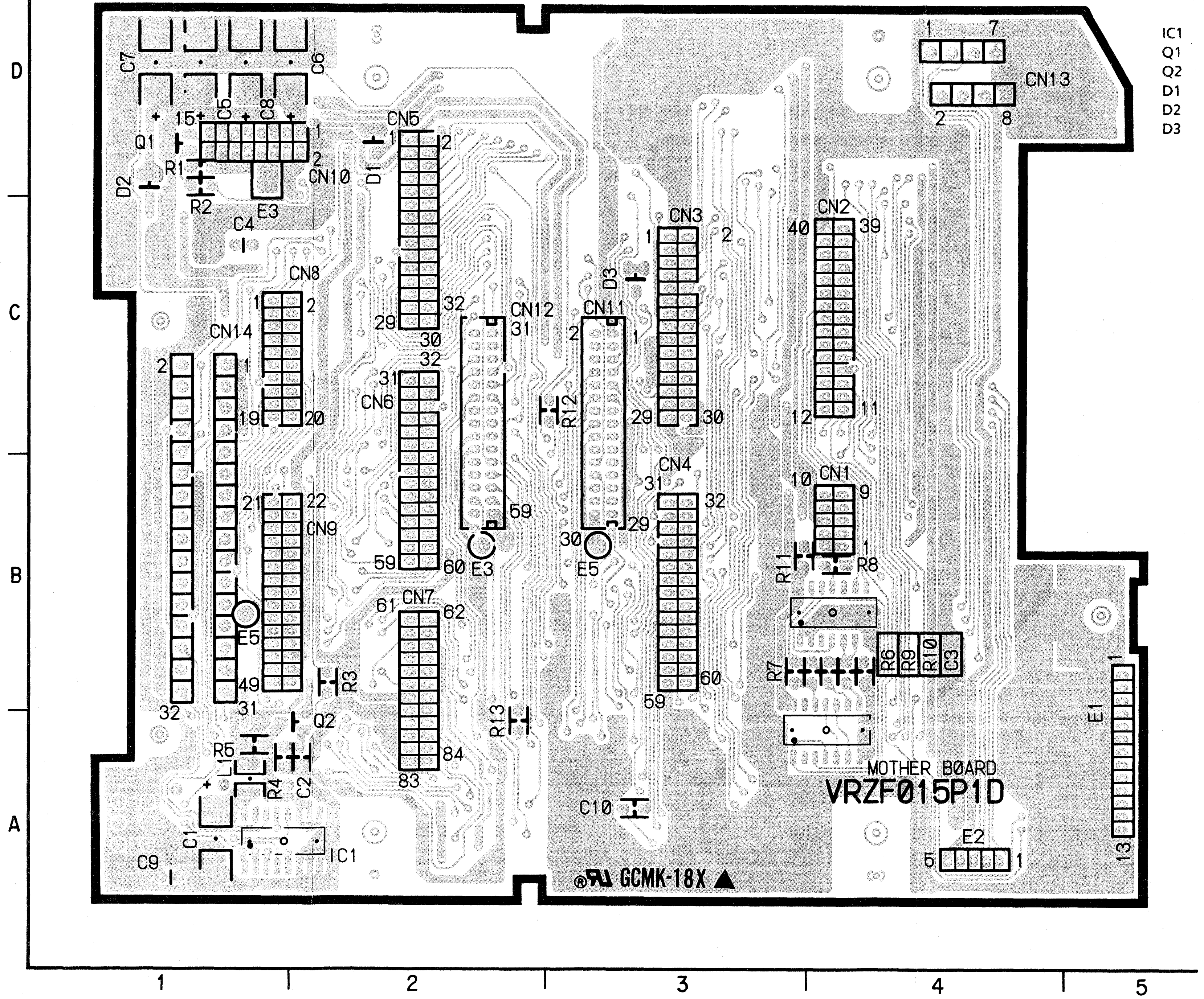

D
C
B
A
1
C7
C6
15
C5
C8
1
Q1
R1
D2
R2
2
CN10
D1
E3
C4
CN8
1
2
CN14
29
2
1
19
20
31
CN6
21
22
CN9
59
E5
61
R3
49
32
31
Q2
R5
L1
R4
C2
C1
C9
IC1

CONDUCTOR VIEW OF MOTHER BOARD



CN10
1
15
2
16
C4
CN8
CN14
2
1
20
19
21
22
CN9
50
31
49
)THER BOARD
L2
RZF015P1D
SW1
L3
C9
⊕
⊖
4
5

MOTHER BOARD (PATTERN SIDE VIEW)

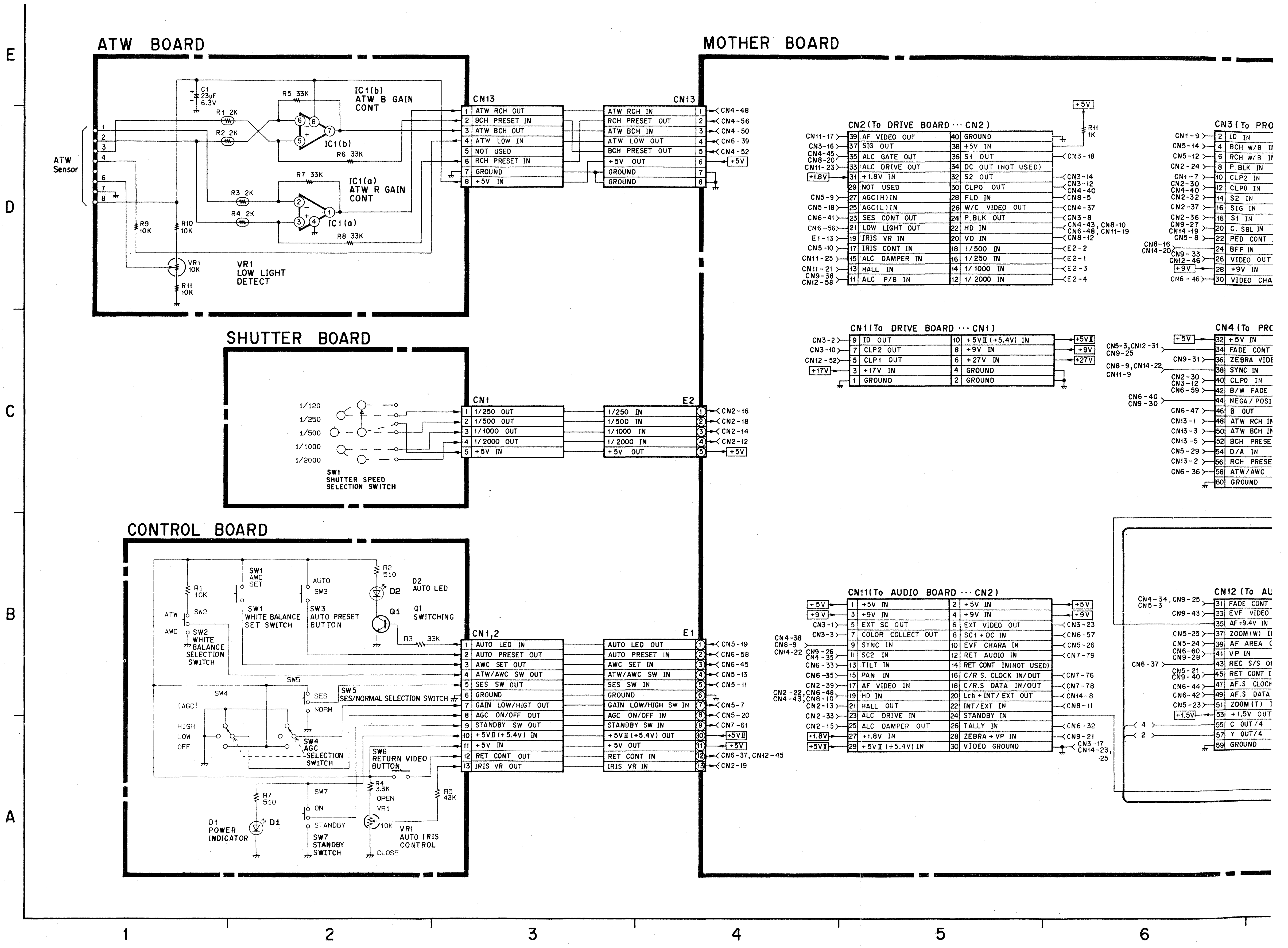


D
C
B
A
1
2
3
4
5
C7
C6
C5
C8
15
1
2
Q1
R1
D2
R2
CN10
E3
C4
CN5
D1
CN8
CN14
29
30
31
32
CN6
CN12
CN11
CN3
D3
CN2
40
39
12
11
R12
CN4
CN1
10
9
R11
R8
CN9
21
22
59
60
E3
E5
CN7
61
62
83
84
R3
Q2
R13
R5
L1
R4
C2
C1
IC1
C9
C10
R7
R6
R9
R10
C3
E1
13
CN13
1
7
2
8
E2
5
MOTHER BOARD
VRZF015P1D
GCMK-18X

<Index>

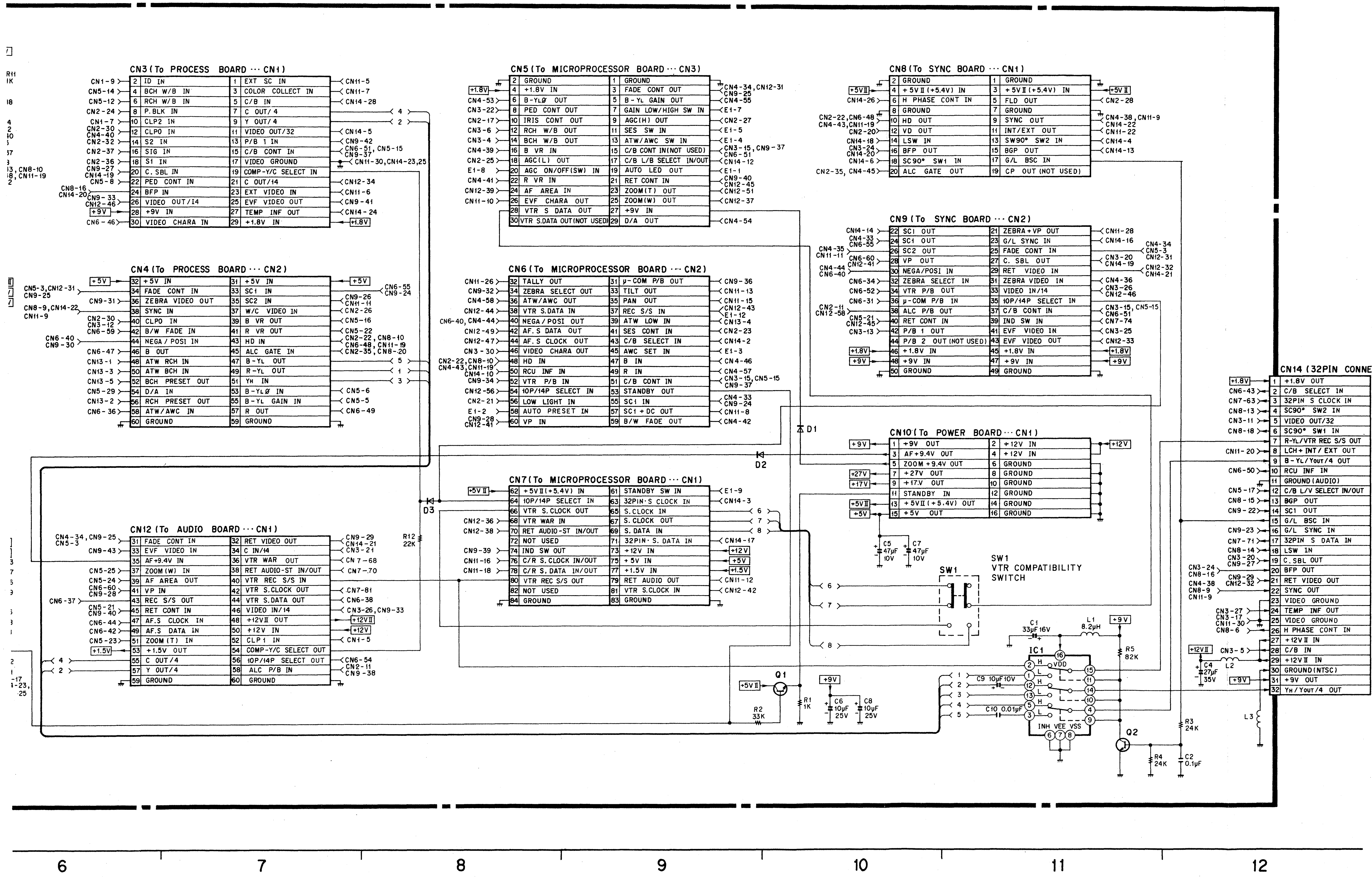
IC1	A1, A2
Q1	D1
Q2	A2
D1	D2
D2	D1
D3	C3

SCHEMATIC DIAGRAM



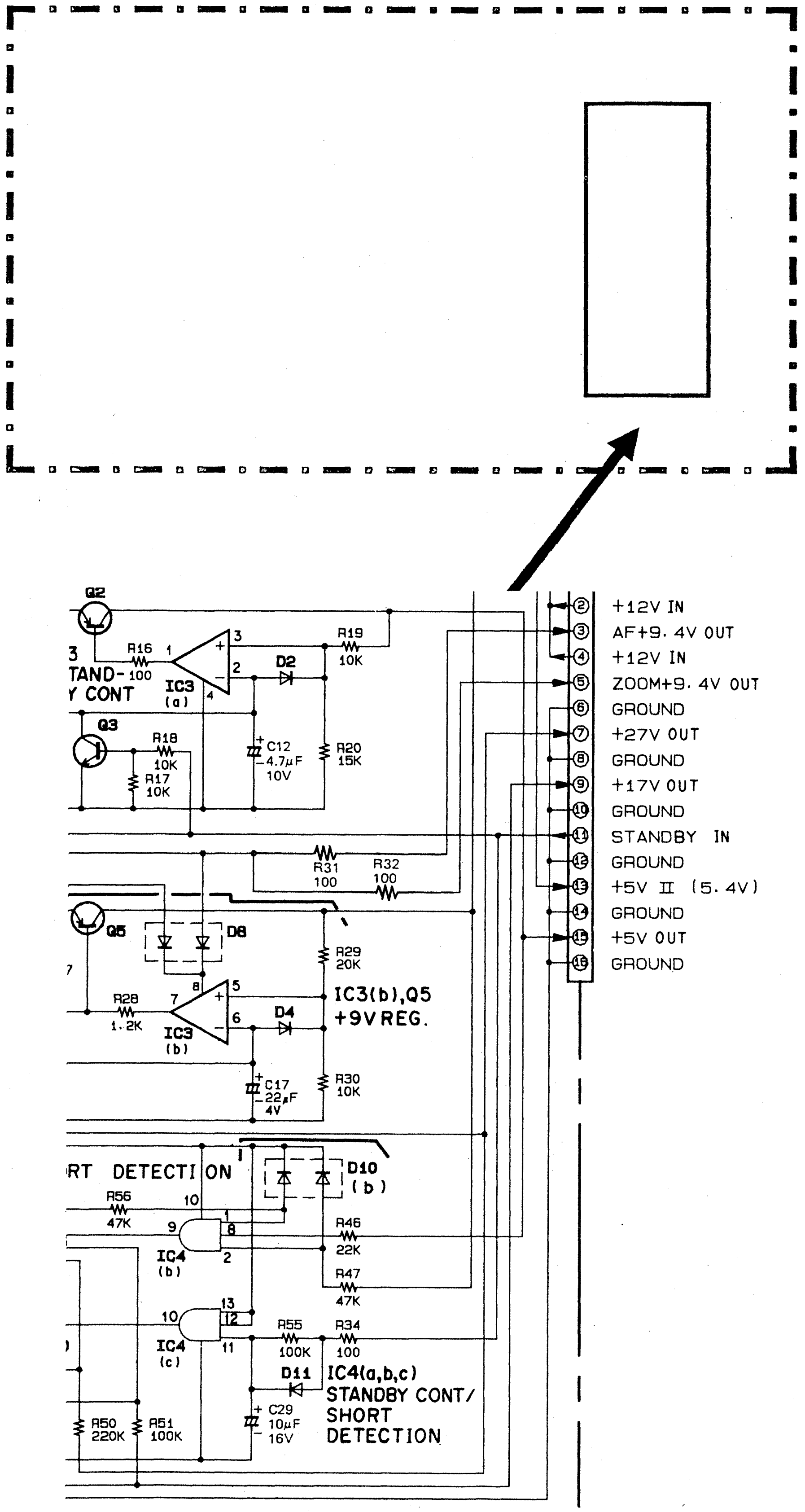
E
D
C
B
A
1
2
3
4
5
6
ATW BOARD
ATW Sensor
C1 23μF 6.3V
R1 2K
R2 2K
R3 2K
R4 2K
R5 33K
R6 33K
R7 33K
R8 33K
R9 10K
R10 10K
R11 10K
IC1(b) ATW B GAIN CONT
IC1(a) ATW R GAIN CONT
VR1 10K
VR1 LOW LIGHT DETECT
CN13
1 ATW RCH OUT
2 BCH PRESET IN
3 ATW BCH OUT
4 ATW LOW IN
5 NOT USED
6 RCH PRESET IN
7 GROUND
8 +5V IN
ATW RCH IN
RCH PRESET OUT
ATW BCH IN
ATW LOW OUT
BCH PRESET OUT
+5V OUT
GROUND
GROUND
CN4-48
CN4-56
CN4-50
CN6-39
CN4-52
+5V
SHUTTER BOARD
1/120
1/250
1/500
1/1000
1/2000
SW1 SHUTTER SPEED SELECTION SWITCH
CN1
1 1/250 OUT
2 1/500 OUT
3 1/1000 OUT
4 1/2000 OUT
5 +5V IN
E2
1/250 IN
1/500 IN
1/1000 IN
1/2000 IN
+5V OUT
CN2-16
CN2-18
CN2-14
CN2-12
CONTROL BOARD
R1 10K
SW2
ATW
AWC
SW2 WHITE BALANCE SELECTION SWITCH
SW1 AWC SET
SW1 WHITE BALANCE SET SWITCH
AUTO
SW3
SW3 AUTO PRESET BUTTON
R2 510
D2 AUTO LED
Q1 SWITCHING
R3 33K
SW4
(AGC)
HIGH
LOW
OFF
SW4 AGC SELECTION SWITCH
SW5
SES
NORM
SW5 SES/NORMAL SELECTION SWITCH
SW6 RETURN VIDEO BUTTON
R4 3.3K
R5 43K
OPEN
VR1
10K
CLOSE
VR1 AUTO IRIS CONTROL
R7 510
D1 POWER INDICATOR
SW7
ON
STANDBY
SW7 STANDBY SWITCH
CN1,2
1 AUTO LED IN
2 AUTO PRESET OUT
3 AWC SET OUT
4 ATW/AWC SW OUT
5 SES SW OUT
6 GROUND
7 GAIN LOW/HIGT OUT
8 AGC ON/OFF OUT
9 STANDBY SW OUT
10 +5VII (+5.4V) IN
11 +5V IN
12 RET CONT OUT
13 IRIS VR OUT
E1
AUTO LED OUT
AUTO PRESET IN
AWC SET IN
ATW/AWC SW IN
SES SW IN
GROUND
GAIN LOW/HIGH SW IN
AGC ON/OFF IN
STANDBY SW IN
+5VII (+5.4V) OUT
+5V OUT
RET CONT IN
IRIS VR IN
CN5-19
CN6-58
CN6-45
CN5-13
CN5-11
CN5-7
CN5-20
CN7-61
+5VII
+5V
CN6-37, CN12-45
CN2-19
MOTHER BOARD
CN2 (To DRIVE BOARD ··· CN2)
39 AF VIDEO OUT
40 GROUND
37 SIG OUT
38 +5V IN
35 ALC GATE OUT
36 S1 OUT
33 ALC DRIVE OUT
34 DC OUT (NOT USED)
31 +1.8V IN
32 S2 OUT
29 NOT USED
30 CLPO OUT
27 AGC(H)IN
28 FLD IN
25 AGC(L)IN
26 W/C VIDEO OUT
23 SES CONT OUT
24 P.BLK OUT
21 LOW LIGHT OUT
22 HD IN
19 IRIS VR IN
20 VD IN
17 IRIS CONT IN
18 1/500 IN
15 ALC DAMPER IN
16 1/250 IN
13 HALL IN
14 1/1000 IN
11 ALC P/B IN
12 1/2000 IN
R11 1K
CN1 (To DRIVE BOARD ··· CN1)
9 ID OUT
10 +5VII (+5.4V) IN
7 CLP2 OUT
8 +9V IN
5 CLP1 OUT
6 +27V IN
3 +17V IN
4 GROUND
1 GROUND
2 GROUND
CN11 (To AUDIO BOARD ··· CN2)
1 +5V IN
2 +5V IN
3 +9V IN
4 +9V IN
5 EXT SC OUT
6 EXT VIDEO OUT
7 COLOR COLLECT OUT
8 SC1 + DC IN
9 SYNC IN
10 EVF CHARA IN
11 SC2 IN
12 RET AUDIO IN
13 TILT IN
14 RET CONT IN(NOT USED)
15 PAN IN
16 C/R S. CLOCK IN/OUT
17 AF VIDEO IN
18 C/R.S DATA IN/OUT
19 HD IN
20 Lch + INT/EXT OUT
21 HALL OUT
22 INT/EXT IN
23 ALC DRIVE IN
24 STANDBY IN
25 ALC DAMPER OUT
26 TALLY IN
27 +1.8V IN
28 ZEBRA + VP IN
29 +5VII (+5.4V) IN
30 VIDEO GROUND
CN3 (To PRO
2 ID IN
4 BCH W/B I
6 RCH W/B I
8 P.BLK IN
10 CLP2 IN
12 CLPO IN
14 S2 IN
16 SIG IN
18 S1 IN
20 C. SBL IN
22 PED CONT
24 BFP IN
26 VIDEO OUT
28 +9V IN
30 VIDEO CHA
CN4 (To PRO
32 +5V IN
34 FADE CONT
36 ZEBRA VIDE
38 SYNC IN
40 CLPO IN
42 B/W FADE
44 NEGA/POSI
46 B OUT
48 ATW RCH IN
50 ATW BCH IN
52 BCH PRESE
54 D/A IN
56 RCH PRESE
58 ATW/AWC
60 GROUND
CN12 (To AU
31 FADE CONT
33 EVF VIDEO
35 AF+9.4V IN
37 ZOOM(W) I
39 AF AREA
41 VP IN
43 REC S/S O
45 RET CONT I
47 AF.S CLOCK
49 AF.S DATA
51 ZOOM(T)
53 +1.5V OUT
55 C OUT/4
57 Y OUT/4
59 GROUND

MATIC DIAGRAM OF MOTHER BOARD

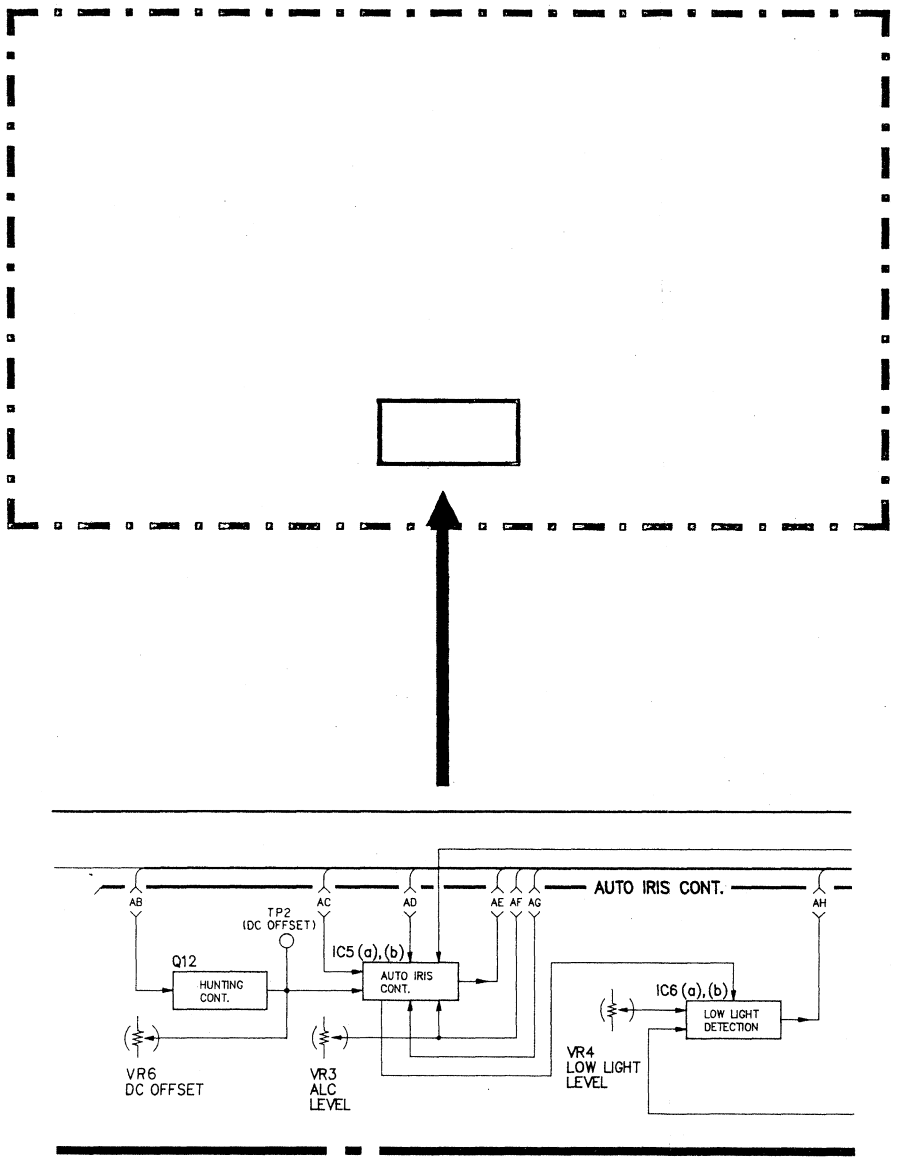


CN3 (To PROCESS BOARD ··· CN1)
CN4 (To PROCESS BOARD ··· CN2)
CN12 (To AUDIO BOARD ··· CN1)
CN5 (To MICROPROCESSOR BOARD ··· CN3)
CN6 (To MICROPROCESSOR BOARD ··· CN2)
CN7 (To MICROPROCESSOR BOARD ··· CN1)
CN8 (To SYNC BOARD ··· CN1)
CN9 (To SYNC BOARD ··· CN2)
CN10 (To POWER BOARD ··· CN1)
CN14 (32PIN CONNECTOR)
SW1 VTR COMPATIBILITY SWITCH
IC1
Q1
Q2
D1
D2
D3
R12 22K
R2 33K
R1 1K
R3 24K
R4 24K
R5 82K
C1 33µF 16V
C2 0.1µF
C4 27µF 35V
C5 47µF 10V
C6 10µF 25V
C7 47µF 10V
C8 10µF 25V
C9 10µF 10V
C10 0.01µF
L1 8.2µH
L2
L3
+1.8V
+5V
+5VⅡ
+9V
+12V
+12VⅡ
+17V
+27V
+1.5V
VDD
INH VEE VSS
6
7
8
9
10
11
12

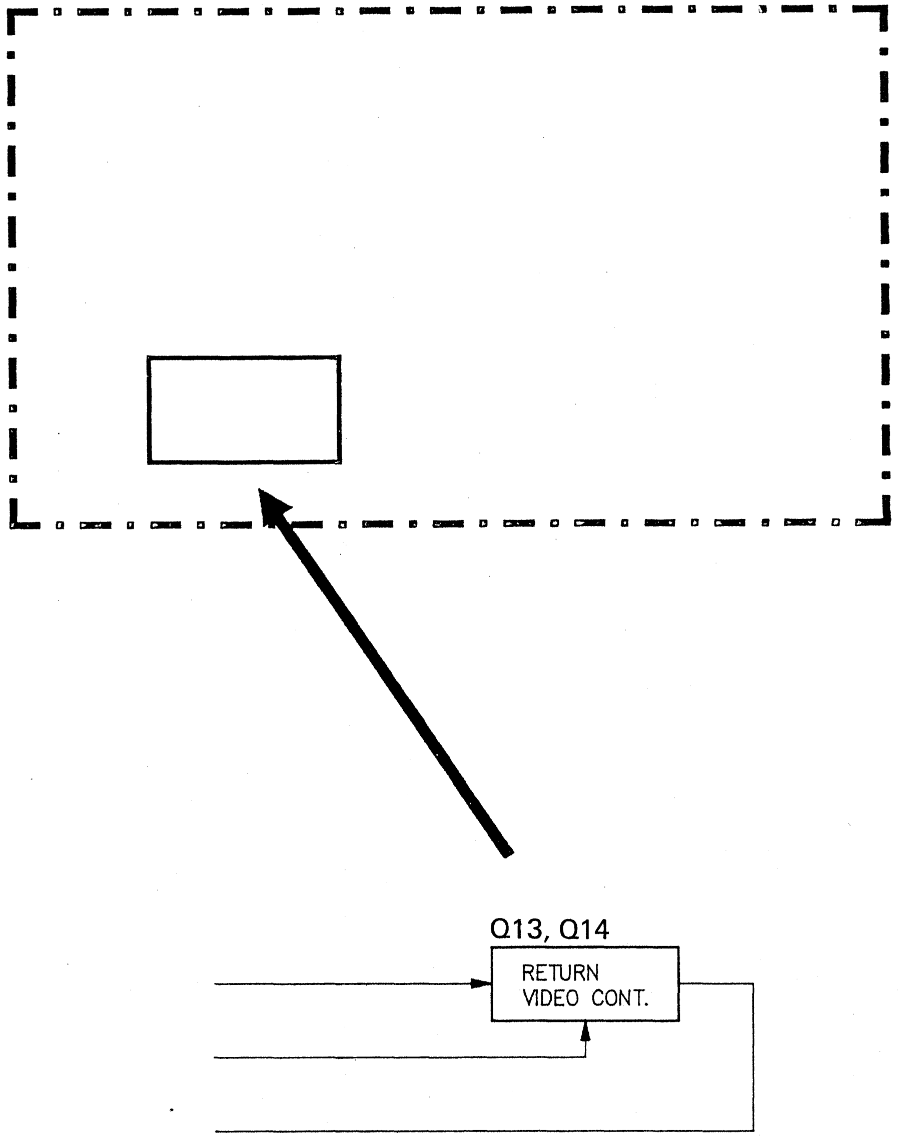
SCHEMATIC DIAGRAM OF POWER BOARD


Q2
3
R16 100
TAND-
Y CONT
IC3 (a)
R19 10K
D2
Q3
R18 10K
R17 10K
C12 4.7μF 10V
R20 15K
R31 100
R32 100
Q5
D8
R29 20K
R28 1.2K
IC3 (b)
D4
IC3(b),Q5
+9V REG.
C17 22μF 4V
R30 10K
RT DETECTION
D10 (b)
R56 47K
IC4 (b)
R46 22K
R47 47K
IC4 (c)
R55 100K
R34 100
D11
IC4(a,b,c)
STANDBY CONT/
SHORT
DETECTION
C29 10μF 16V
R50 220K
R51 100K
② +12V IN
③ AF+9.4V OUT
④ +12V IN
⑤ ZOOM+9.4V OUT
⑥ GROUND
⑦ +27V OUT
⑧ GROUND
⑨ +17V OUT
⑩ GROUND
⑪ STANDBY IN
⑫ GROUND
⑬ +5V II (5.4V)
⑭ GROUND
⑮ +5V OUT
⑯ GROUND

BLOCK DIAGRAM OF DRIVE BOARD


AUTO IRIS CONT.
AB
AC
AD
AE
AF
AG
AH
TP2 (DC OFFSET)
Q12
HUNTING CONT.
IC5 (a),(b)
AUTO IRIS CONT.
IC6 (a),(b)
LOW LIGHT DETECTION
VR6 DC OFFSET
VR3 ALC LEVEL
VR4 LOW LIGHT LEVEL

BLOCK DIAGRAM OF AUDIO BOARD



REPLACEMENT PARTS LIST MODIFICATION

Important Notice

1 Components identified by " ⚠ " mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

2 Printed circuit board assembly with mark (NLA) is no longer available after production discontinuation of the complete set.

REFERENCE NO.	ORIGINAL PART NO.	NEW PART NO.	DESCRIPTION	
SYNC BOARD				
R10	ERJ3GEYJ331	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R16	ERJ3GEYJ183	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R17	ERJ3GEYJ153	ERJ3GEYJ133	Carbon	13K ohms 1/16W
R19	ERJ3GEYJ183	ERJ3GEYJ243	Carbon	24K ohms 1/16W
R38	ERJ3GEYJ331	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R52	ERJ3GEYJ912	ERJ3GEYJ133	Carbon	13K ohms 1/16W
R120	ERJ3GEYJ102	------------------	Deletion	
VR2	EVND2AA00BS3	EVND2AA00BS3	Variable Resistor	6.8K ohms
C34	YW5CH100J5VB	YW5CH300J5VB	Ceramic	30 pF
C35	ECSF1AE106	ECSF0JE106	Tantalum	10 µF 6.3V
C60	YW5CH121J5VB	YF400121CHJT	Ceramic	120 pF
C84	------------------	YW5CH100J5VB	Ceramic	10 pF
L2	ELJFA8R2MF	YFF3216E8R2K	Coil	8.2 µH
L11	ELJFA8R2MF	YFF3216E8R2K	Coil	8.2 µH
J29	ERJ3GEY0R00	------------------	Deletion	
DRIVE BOARD				
IC9	YWTC7S32FR	------------------	IC	
R9,10,13,119	------------------	ERJ3GEY0R00	Jumper Resistor	
R134,141,150,195	------------------	ERJ3GEY0R00	Jumper Resistor	
R229	------------------	ERJ3GEY0R00	Jumper Resistor	
R230	------------------	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R231	------------------	ERJ3GEYJ560	Carbon	56 ohms 1/16W
VR6	------------------	EVM13SW00B14	Variable Resistor	10K ohms
C13	YW5F104Z2VB	------------------	Deletion	
C33	ECST0GD476	ECST0JD476ZR	Tantalum	47 µF 6.3V
C71	ECST1AD226	ECST1ED10ZR6	Tantalum	10 µF 25V
J9,10,13,119	ERJ3GEY0R00	------------------	Jumper Resistor	
J134,141,150,195	ERJ3GEY0R00	------------------	Jumper Resistor	
J229	ERJ3GEY0R00	------------------	Jumper Resistor	
PROCESS BOARD				
R9	ERJ3GEYJ203	ERJ3GEY0R00	Jumper Resistor	
R35	ERJ3GEYJ562	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R147	ERJ3GEYJ182	ERJ3GEYJ392	Carbon	3.9K ohms 1/16W
R148	ERJ3GEYJ152	ERJ3GEYJ511	Carbon	510 ohms 1/16W
R160	ERJ3GEYJ103	------------------	Deletion	
R163	ERJ3GEYJ103	------------------	Deletion	
R174	ERJ3GEYJ223	ERJ3GEYJ103	Carbon	10K ohms 1/16W

REFERENCE NO.	ORIGINAL PART NO.	NEW PART NO.	DESCRIPTION	
R231	ERJ3GEYJ103	ERJ3GEYJ223	Carbon	22K ohms 1/16W
R241	ERJ3GEYJ103	ERJ3GEYJ153	Carbon	15K ohms 1/16W
R246	ERJ3GEYJ132	ERJ3GEYJ122	Carbon	1.2K ohms 1/16W
R262	ERJ3GEYJ272	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
R283	LP163K3G222	LP163K3G322	Metal	3.2K ohms 1/16W
R289	----------------	ERJ8GCS0R00	Jumper Resistor	
R290	----------------	ERJ3GEYJ152	Carbon	1.5K ohms 1/16W
C43	ECEA0JS470	ECEA1AS470	Electrolytic	47 µF 10V
C57	ECEA0JS470	ECEA1AS470	Electrolytic	47 µF 10V
C65	ECEA0JS470	ECEA1AS470	Electrolytic	47 µF 10V
C89	YW5CH220J5VB	YW5CH470J5VB	Ceramic	47 pF
J2,3	----------------	ERJ3GEY0R00	Jumper Resistor	
J2,3	----------------	ERJ3GEY0R00	Jumper Resistor	
J261	ERJ3GEY0R00	----------------	Deletion	
J261	ERJ3GEY0R00	----------------	Deletion	

PROCESS SUB BOARD

REFERENCE NO.	ORIGINAL PART NO.	NEW PART NO.	DESCRIPTION	
R14	ERJ3GEYJ102	ERJ3GEYJ122	Carbon	1.2K ohms 1/16W
R15	L311F102G502	L311F102G502	Carbon	1K ohms 1/16W
R78	ERJ3GEYJ682	ERJ3GEYJ103	Carbon	10K ohms 1/16W
R87	L311F182G502	L311F182G502	Carbon	1.8K ohms 1/16W
R96	L311F182G502	L311F182G502	Carbon	1.8K ohms 1/16W
R116	ERJ3GEYJ153	ERJ3GEYJ123	Carbon	12K ohms 1/16W
C78	ECEA0JS470	ECSF1AE476	Tantalum	47 µF 10V

MICROPROCESSOR BOARD

REFERENCE NO.	ORIGINAL PART NO.	NEW PART NO.	DESCRIPTION	
IC	MN17581CC02	MN17581CC03	IC	
D1	MA141K	----------------	Deletion	
R107,124,127,130	----------------	ERJ3GEY0R00	Jumper Resistor	
R192	ERJ3GEYJ303	ERJ3GEYJ433	Carbon	43K ohms 1/16W
R197	ERJ3GEYJ303	ERJ3GEYJ433	Carbon	43K ohms 1/16W
R223	ERJ3GEYJ333	----------------	Deletion	
R227	----------------	ERJ3GEY0R00	Jumper Resistor	
R232	ERJ3GEYJ912	ERJ3GEYJ133	Carbon	13K ohms 1/16W
C48	ECEA0JKS470	ECEA0JKN330	Electrolytic	33 µF 6.3V
X2	EF0-FC8004	EF0GC8004A4	Crystal Oscillator	
J107,124	ERJ3GEY0R00	----------------	Deletion	
J127,130	ERJ3GEY0R00	----------------	Deletion	
J227	ERJ3GEY0R00	----------------	Deletion	
TP2-4	----------------	YW32BM5A	Test-pin	

POWER BOARD

REFERENCE NO.	ORIGINAL PART NO.	NEW PART NO.	DESCRIPTION	
D1	EK14	YWEK14	Diode	
D3	EK14	YWEK14	Diode	
D6,7	EK14	YWEK14	Diode	
C12	ECCSF1EE475	ECST1AY475	Tantalum	4.7 µF 10V

REFERENCE NO.	ORIGINAL PART NO.	NEW PART NO.	DESCRIPTION	

AUDIO BOARD

REFERENCE NO.	ORIGINAL PART NO.	NEW PART NO.	DESCRIPTION	
Q13	-----------------	2SB709-QRS	Transistor	
Q14	-----------------	2SK198-Q	Transistor	
R30	YF2116200JT	YF2116101JT	Carbon	100 ohms 1/16W
R36	-----------------	YF21160R00T	Jumper Resistor	
R40	YF2116122JT	-----------------	Deletion	
R57	-----------------	YF2116101JT	Carbon	100 ohms 1/16W
R63	-----------------	YF21160R00T	Jumper Resistor	
R64	-----------------	YF2116750JT	Carbon	75 ohms 1/16W
R65,66	-----------------	YF2116103JT	Carbon	10K ohms 1/16W
R67	-----------------	YF2116681JT	Carbon	680 ohms 1/16W
R68	-----------------	YF2116333GT	Carbon	33K ohms 1/16W
R69	-----------------	YF2116103JT	Carbon	10K ohms 1/16W
C3	ECQV1H473JZ	ECQM1H473JZ	Plastic	0.047 µF 50V
C14	ECQV1H473JZ	ECQM1H473JZ	Plastic	0.047 µF 50V
C43	-----------------	ECEA1AKS470	Electrolytic	47 µF 10V
CF1	YFBL1RN1A62	-----------------	Deletion	
L1	-----------------	YFBL1RN1A62	Filter	
F1	YWSSFR1R5A	-----------------	Deletion	
SF1	-----------------	YWSSFR1R5A	Current Fuse	
F2	YWSSFR2A	-----------------	Deletion	
SF2	-----------------	YWSSFR2A	Current Fuse	
J36,63	YF21160R00T	-----------------	Deletion	

SENSOR BOARD

REFERENCE NO.	ORIGINAL PART NO.	NEW PART NO.	DESCRIPTION	
R3,34,35,37	-----------------	YF21160R00T	Jumper Resistor	
R60,62,64,65	-----------------	YF21160R00T	Jumper Resistor	
L3	HF70BB5X5X2	-----------------	Deletion	
J3,34,35,37	YF2116122JT	-----------------	Deletion	
J60,62,64,65	YF2116122JT	-----------------	Deletion	
CN1	YW559722APB	YW559718APB	18-pin Connector	

MOTHER BOARD

REFERENCE NO.	ORIGINAL PART NO.	NEW PART NO.	DESCRIPTION	
IC2	MN74HC221S	-----------------	Deletion	
R12	-----------------	YF2116223JT	Carbon	22K ohms 1/16W
R13	-----------------	YF2116102GT	Carbon	1K ohms 1/16W
R14	YF2116223JT	-----------------	Deletion	
C10	YF400104FZT	-----------------	Deletion	
CF2,3	YFBL1RN1A62	-----------------	Deletion	
L2,3	-----------------	YFBL1RN1A62	Filter	